



August 4, 2003

Mr. Steve Trent Fluor Hanford Inc. 825 Jadwin Avenue Richland, WA 99352

Reference:

P.O. #630

Eberline Services R3-06-068-7538, SDG H2264

Dear Mr. Trent:

Enclosed is the data report for one solid sample designated under SAF No. F03-006 received at Eberline Services on June 13, 2003. The sample was analyzed according to the accompanying chain-of-custody document.

Please call if you have any questions concerning this report.

Sincerely,

Melissa C. Mannion

Melino Mamm

Program Manager

MCM

Enclosure: Data Package

EDMC



Analytical Services 2030 Wright Avenue P.O. Box 4040 Richmond, California 94804-0040 (510) 235-2633 Fax (510) 235-0438 Toll Free (800) 841-5487 www.eberlineservices.com

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1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H2264 was composed of one solid (soil) samples designated under SAF No. F03-006 with a Project Designations of: 200-PW-2/200-PW-4 OU – Borehole Soil Sampling.

The sample was received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Tritium Analyses

No problems were encountered during the course of the analyses.

2.2 Carbon-14 Analyses

No problems were encountered during the course of the analyses.

2.3 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

2.4 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.5 Technetium-99 Analyses

No problems were encountered during the course of the analyses.

2.6 lodine-129 Analyses

No problems were encountered during the course of the analyses.

2.7 Isotopic Thorium Analyses

No problems were encountered during the course of the analyses.

2.8 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses.

2.9 Total Uranium Analyses

No problems were encountered during the course of the analyses.

Case Narrative

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2.10 Neptunium-237 Analyses

The LCS percent recovery (78%) was slightly below the laboratory protocol limits (80 to 120%), but within the contract limits (70 to 130%). No other problems were encountered during the course of the analyses.

2.11 Isotopic Plutonium Analyses

No problems were encountered during the course of the reanalyses.

2.12 Americium-241 Analyses

No problems were encountered during the course of the analyses.

2.13 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Mulum Mummi 8/4/3

Melissa C. Mannion Date

Program Manager

SDG <u>7538</u> Contact <u>Melissa C. Mannion</u> Client Hanford
Contract No. 630
Case no SDG_H2264

SUMMARY DATA SECTION

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neur	Mam
Prepared	by

Melen Morron

Reviewed by

Lab id	EBRLNE
Protocol	Hanford
Version	<u>Ver 1,0</u>
Form	DVD-TOC
Version	3.06
Report date	08/04/03

SAMPLE DELIVERY GROUP H2264

SDG 7538
Contact Melissa C. Mannion

REPORT GUIDE

Client	Hani	ford		
Contract	No.	630		
Case no	SDG	H2264	 	

ABOUT THE DATA SUMMARY SECTION

The Data Summary Section of a Data Package has all data, in several useful orders, necessary for first level, routine review of the data package for a Sample Delivery Group (SDG). This section follows the Data Package Narrative, which has an overview of the data package and a discussion of special problems. It is followed by the Raw Data Section, which has full details.

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

The Sample and QC Summary Reports show all samples, including QC samples, reported in one SDG. These reports cross-reference client and lab sample identifiers.

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches (lab groupings reflecting how work was organized) relevant to the reported SDG with information necessary to check the completeness and consistency of the SDG.

WORK SUMMARY

The Work Summary Report shows all samples and work done on them relevant to the reported SDG.

METHOD BLANKS

The Method Blank Reports, one for each Method Blank relevant to the SDG, show all results and primary supporting information for the blanks.

LAB CONTROL SAMPLES

The Lab Control Sample Reports, one for each Lab Control Sample relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

REPORT GUIDES

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SAMPLE DELIVERY GROUP H2264

SDG 7538
Contact Melissa C. Mannion

GUIDE, cont.

Client	Hani	ford	
Contract	No.	630	
Case no	SDG	H2264	

ABOUT THE DATA SUMMARY SECTION

DUPLICATES

The Duplicate Reports, one for each Duplicate and Original sample pair relevant to the SDG, show all results, differences and primary supporting information for these QC samples.

MATRIX SPIKES

The Matrix Spike Reports, one for each Spiked and Original sample pair relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

DATA SHEETS

The Data Sheet Reports, one for each client sample in the SDG, show all results and primary supporting information for these samples.

METHOD SUMMARIES

The Method Summary Reports, one for each test used in the SDG, show all results, QC and method performance data for one analyte on one or two pages. (A test is a short code for the method used to do certain work to the client's specification.)

REPORT GUIDES

The Report Guides, one for each of the above groups of reports, have documentation on how to read the associated reports.

REPORT GUIDES
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Page 2

SDG <u>7538</u> Contact <u>Melissa C. Mannion</u>

LAB SAMPLE SUMMARY

Client Hanford
Contract No. 630
Case no SDG H2264

LAB SAMPLE ID	CLIENT SAMPLE ID	LOCATION	MATRIX LE	EVEL	SAF NO	CHAIN OF CUSTODY	COLLECTED
R306068-01	B161C2	216-B-12 (C3246)	SOLID		F03-006	F03-006-189	06/11/03 09:2
R306068-02	Lab Control Sample		SOLID		F03-006		
R306068-03	Method Blank		SOLID		F03-006		
R306068-04	Duplicate (R306068-01)	216-B-12 (C3246)	SOLID		F03-006		06/11/03 09:25
R306068-05	Spike (R306068-01)	216-B-12 (C3246)	SOLID		F03-006		06/11/03 09:25

LAB SUMMARY
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SDG	7538		
Contact	Melissa	c.	Mannion

QC SUMMARY

Hanford
No. 630
SDG_H2264

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	X SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS S		LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7538	F03-006-189	B161C2	SOLID	97.4	258.7 g		06/13/03	2	R306068-01	7538-001
		Method Blank	SOLID						R306068-03	7538-003
		Lab Control Sample	SOLID						R306068-02	7538-002
		Duplicate (R306068-01)	SOLID	97.4	258.7 g		06/13/03	2	R306068-04	7538-004
		Spike (R306068-01)	SOLID	97.4	258.7 g		06/13/03	2	R306068-05	7538-005

QC SUMMARY
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Contact	<u>Melissa</u>	c.	Manni on

PREP BATCH SUMMARY

Client <u>Hanford</u>
Contract <u>No. 630</u>
Case no <u>SDG_H2264</u>

			PREPARATION	ERROR			- PLA	NCHETS /	ANALYZ	ED	QUAL I -
TEST	MATRIX	METHOD	BATCH	2σ %	CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG MS/ORIG	FIERS
Alpha	a Spectros	сору									
AM	SOLID	Americium 241 in Soil	7071-086	5.0	1			1	1	1/1	
NP	SOLID	Neptunium in Soil	7071-086	5.0	1			1	1	1/1	
PU	SOLID	Plutonium, Isotopic in Solids	7071-086	5.0	1			1	1	1/1	<u> </u>
TH	SOLID	Thorium, Isotopic in Soil	7071-086	5.0	1	-		1	1	1/1	
U	SOLID	Uranium, Isotopic in Soil	7071-086	5.0	1			1	1	1/1	
Beta	Counting										
SR	SOLID	Total Strontium in Soil	7071-086	10.0	1			1	1	1/1	
TC	SOLID	Technetium 99 in Soil	7071-086	10.0	1			1	1	1/1	
Салты	s Spectros	всору									
GAM	SOLID	Gamma Scan	7071-086	15.0	1			1	1	1/1	
ī	SOLID	Iodine 129 in Soil	7071-086	10.0	1			1	1	1/1	
Kinet	tic Phosph	orimetry (KPA)									
U_T	SOLID	Uranium, Total in Soil	7071-086	9.0	1			1	1	1/1	
Liqui	id Scintil	lation Counting									
С	SOLID	Carbon 14 in Soil	7071-086	10.0	1			1	1	1/1	
H	SOLID	Tritium in Soil	7071-086	10.0	1			1	1	1/1 1/1	x
NI_L	SOLID	Nickel 63 in Soil	7071-086	10.0	1			1	1	1/1	
					,						

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

PREP BATCH SUMMARY
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LAB WORK SUMMARY

Client <u>Hanford</u>
Contract <u>No. 630</u>
Case no <u>SDG H2264</u>

LAB SAMPLE	CLIENT SAMPLE I	(D								
COLLECTED RECEIVED	LOCATION CUSTODY	SAF No	MATRIX	PLANCHET	TEST	SUF- FIX	ANALYZED	REVIEWED	вч	МЕТНОО
R306068-01	B161C2			7538-001	AM		07/21/03	08/03/03	MCM	Americium 241 in Soil
06/11/03	216-B-12 (C3246	5)	SOLID	7538-001	С		07/18/03	08/03/03	MCM	Carbon 14 in Soil
06/13/03	F03-006-189	F03-006		7538-001	GAM		06/27/03	08/03/03	MCM	Gamma Scan
00, 10, 10				7538-001	Н		07/24/03	08/03/03	MCM	Tritium in Soil
				7538-001	I		07/24/03	08/03/03	MCM	Iodine 129 in Soil
				7538-001	NI_L		07/18/03	08/03/03	MCM	Nickel 63 in Soil
				7538-001	NP		07/22/03	08/03/03	MCM	Neptunium in Soil
				7538-001	PU		07/23/03	08/03/03	MCM	Plutonium, Isotopic in Solids
				7538-001	SR		07/18/03	08/03/03	MCM	Total Strontium in Soil
				7538-001	TC		07/28/03	08/03/03	MCM	Technetium 99 in Soil
				7538-001	TH		07/23/03	08/03/03	MCM	Thorium, Isotopic in Soil
				7538-001	บ		07/22/03	08/03/03	MCM	Uranium, Isotopic in Soil
		•		7538-001	U_T		07/03/03	08/03/03	MCM	Uranium, Total in Soil
R306068-02	Lab Control San	mole		7538-002	АМ		07/21/03	08/03/03	MCM	Americium 241 in Soil
		•	SOLID	7538-002	C		07/18/03	08/03/03	MCM	Carbon 14 in Soil
		F03-006		7538-002	GAM		06/27/03	08/03/03	MCM	Gamma Scan
				7538-002	Н		07/24/03	08/03/03	MCM	Tritium in Soil
				7538-002	I		07/28/03	08/03/03	MCM	Iodine 129 in Soil
				7538-002	NI_L		07/19/03	08/03/03	MCM	Nickel 63 in Soil
				7538-002	NP		07/22/03	08/03/03	MCM	Neptunium in Soil
				7538-002	PU		07/23/03	08/03/03	MCM	Plutonium, Isotopic in Solids
				7538-002	SR		07/18/03	08/03/03	MCM	Total Strontium in Soil
				7538-002	TC		07/25/03	08/03/03	MCM	Technetium 99 in Soil
				7538-002	TH		07/23/03	08/03/03	MCM	Thorium, Isotopic in Soil
				7538-002	U		07/22/03	08/03/03	MCM	Uranium, Isotopic in Soil
				7538-002	U_T		07/03/03	08/03/03	MCM	Uranium, Total in Soil

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WORK SUMMARY, cont.

Client <u>Hanford</u>
Contract <u>No. 630</u>
Case no <u>\$DG_H2264</u>

R306068-03	Method Blank			PLANCHET	TEST	FIX	ANALYZED	REVIEWED	ВҮ	METHOD
KJ00000 03				7538-003	АМ		07/21/03	08/03/03	мсм	Americium 241 in Soil
			SOLID	7538-003	С		07/18/03	08/03/03	MCM	Carbon 14 in Soil
	F	03-006		7538-003	GAM		06/28/03	08/03/03	MCM	Gamma Scan
				7538-003	Н		07/25/03	08/03/03	MCM	Tritium in Soil
				7538-003	I		07/25/03	08/03/03	MCM	Iodine 129 in Soil
				7538-003	NI_L		07/19/03	08/03/03	MCM	Nickel 63 in Soil .
				7538-003	NP		07/22/03	08/03/03	MCM	Neptunium in Soil
				7538-003	PU		07/23/03	08/03/03	MCM	Plutonium, Isotopic in Solids
				7538-003	SR		07/18/03	08/03/03	MCM	Total Strontium in Soil
				7538-003	TC		07/26/03	08/03/03	MCM	Technetium 99 in Soil
				7538-003	TH		07/23/03	08/03/03	MCM	Thorium, Isotopic in Soil
				7538-003	U		07/22/03	08/03/03	MCM	Uranium, Isotopic in Soil
				7538-003	U_T		07/03/03	08/03/03	MCM	Uranium, Total in Soil
R306068-04	Duplicate (R306068	8-01)		7538-004	AM		07/21/03	08/03/03	MCM	Americium 241 in Soil
06/11/03	216-B-12 (C3246)		SOLID	7538-004	C		07/18/03	08/03/03	MCM	Carbon 14 in Soil
06/13/03	FC	03-006		7538-004	GAM		06/28/03	08/03/03	MCM	Gamma Scan
				7538-004	H		07/25/03	08/03/03	MCM	Tritium in Soil
				7538-004	1		07/25/03	08/03/03	MCM	Iodine 129 in Soil
				7538-004	NI_L		07/19/03	08/03/03	MCM	Nickel 63 in Soil
				7538-004	NP		07/22/03	08/03/03	MCM	Neptunium in Soil
				7538-004	PU		07/23/03	08/03/03	MCM	Plutonium, Isotopic in Solids
				7538-004	SR		07/18/03	08/03/03	MCM	Total Strontium in Soil
				7538-004	TC		07/25/03	08/03/03	MCM	Technetium 99 in Soil
				7538-004	TH		07/23/03	08/03/03	MCM	Thorium, Isotopic in Soil
	,			7538-004	U		07/22/03	08/03/03	MCM	Uranium, Isotopic in Soil
				7538-004	U_T		07/03/03	08/03/03	MCM	Uranium, Total in Soil
R306068-05	Spike (R306068-01))		7538-005	. н		07/25/03	08/03/03	MCM	Tritium in Soil
06/11/03	216-B-12 (C3246)		SOL ID							
06/13/03	F	03-006								

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SDG 7538
Contact Melissa C. Mannion

WORK SUMMARY, cont.

Client	Hanford
Contract	No. 630
Case no	SDG_H2264

TEST	SAF No	COUNTS OF	TESTS BY SAM	CLIENT MORE	RE BLANK	LCS	DUP SPIKE	TOTAL
АМ	F03-006	Americium 241 în Soil	AMCMISO_IE_PLATE_AEA	1	1	1	1	4
С	F03-006	Carbon 14 in Soil	C14_COX_LSC	1	1	1	1	4
GAM	F03-006	Gamma Scan	GAMMA_GS	1	1	1	1	4
Н	F03-006	Tritium in Soil	906.0_H3_LSC	1	1	1	1 1	5
I	F03-006	Iodine 129 in Soil	I 129_SEP_LEPS_GS	1	1	1	1	4
NI_L	F03-006	Nickel 63 in Soil	N163_LSC	1	1	1	1	4
NP	F03-006	Neptunium in Soil	NP237_LLE_PLATE_AEA	1	1	1	1	4
PU	F03-006	Plutonium, Isotopic in Solids	PUISO_PLATE_AEA	1	1	1	1	4
SR	F03-006	Total Strontium in Soil	SRTOT_SEP_PRECIP_GPC	1	1	1	1	4
TC	F03-006	Technetium 99 in Soil	TC99_TR_SEP_LSC	1	1	1	1	4
TH	F03-006	Thorium, Isotopic in Soil	THISO_IE_PLATE_AEA	1	1	1	1	4
U	F03-006	Uranium, Isotopic in Soil	UISO_PLATE_AEA	1	1	1	1	4
U_T	F03-006	Uranium, Total in Soil	UTOT_KPA	1	1	1	1	4
TOTALS		•		13	13	13	13 1	53

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7538-003

METHOD BLANK

Method Blank

	7538 Melissa C. Mannion	Client/Case no Contract	 SDG_H2264
Lab sample id Dept sample id		Client sample id Material/Matrix SAF No	SOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	0.031	0.15	0.26	400	U	Н
Carbon 14	14762-75-5	-0.143	1.2	2.0	50	U	С
Nickel 63	13981-37-8	-0.397	1.2	2.0	30	ប	$\mathtt{NI}_{-}\mathtt{L}$
Total Strontium	SR-RAD	0.026	0.22	0.44	1.0	ប	SR
Technetium 99	14133-76-7	0.115	0.18	0.56	15	υ	TC
Thorium 228	14274-82-9	0.038	0.077	0.15		Ü	TH
Thorium 230	14269-63-7	0.134	0.15	0.32	1.0	U	TH
Thorium 232	TH-232	0	0.038	0.15	1.0	U	TH
Total Uranium (ug/g)	7440-61-1	0	0.002	0.004	1.0	U	U_T
Uranium 233/234	U-233/234	0	0.038	0.15	1.0	U	U
Uranium 235	15117-96-1	0.023	0.046	0.18	1.0	ប	Ŭ
Uranium 238	U-238	0.019	0.038	0.15	1.0	U	U
Neptunium 237	13994-20-2	-0.004	0.015	0.042	1.0	U	NP
Plutonium 238	13981-16-3	0.049	0.049	0.19	1.0	ប	PU
Plutonium 239/240	PU-239/240	0	0.049	0.19	1.0	U	ΡÜ
Americium 241	14596-10-2	0.136	0.14	0.26	1.0	ប	AM
Iodine 129	15046-84-1	0.201	0.32	0.72	2.0	ប	I
Potassium 40	13966-00-2	U		0.88		บ	GAM
Cobalt 60	10198-40-0	ប		0.049	0.050	ប	GAM
Tin 126	15832-50-5	ប		0.065		U	GAM
Cesium 134	13967-70-9	U		0.055		U	gäm
Cesium 137	10045-97-3	ប		0.047	0.10	ប	GAM
Radium 226	13982-63-3	ប		0.092		ט	GAM
Radium 228	15262-20-1	υ		0.22		U	GAM
Europium 152	14683-23-9	υ		0.12	0.10	U	GAM
Europium 154	15585-10-1	ប		0.16	0.10	U	GAM
Europium 155	14391-16-3	υ		0.11	0.10	U	GAM
Thorium 228	14274-82-9	U		0.064		U	GAM
Thorium 232	TH-232	U		0.22		U	GAM

200-PW-2/200-PW-4 OU - Borehole Soil

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7538-003

BLANK, cont.

Method Blank

i	7538 Melissa C. Mannion	Client/Case no Contract	 SDG_H2264
Lab sample id Dept sample id		Client sample id Material/Matrix SAF No	ŞOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 235	15117-96-1	ש		0.18		U	GAM
Uranium 238	U-238	υ		6.2		U	GAM
Americium 241	14596-10-2	ប		0.12		Ŭ	GAM

200-PW-2/200-PW-4 OU - Borehole Soil

QC-BLANK 44993

METHOD BLANKS
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LAB CONTROL SAMPLE

Lab Control Sample

SDG 7538 Contact Melissa C. Mannion	Client/Case no <u>Hanford</u> <u>SDG_H2264</u> Contract <u>No. 630</u>
Lab sample id <u>R306068-02</u> Dept sample id <u>7538-002</u>	Client sample id <u>Lab Control Sample</u> Material/Matrix

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	12.5	0.39	0.26	400		н	12.9	0.52	97	84-116	80-120
Carbon 14	1410	28	6.2	50		С	1480	59	95	84-116	80-120
Nickel 63	212	4.5	2.4	30		NI_L	228	9.1	93	85-115	80-120
Total Strontium	21.0	0.96	0.34	1.0		SR	21.0	0.84	100	82-118	80-120
Technetium 99	118	2.6	0.57	15		TC	109	4.4	108	82-118	80-120
Thorium 230	38.6	2.8	0.32	1.0		TH	40.8	1.6	95	86-114	80-120
Total Uranium (ug/g)	17.2	2.0	0.042	1.0		U_T	16.5	0.66	104	76-124	80-120
Uranium 233/234	19.0	1.6	0.74	1.0		U	18.6	0.74	102	84-116	80-120
Uranium 235	14.7	1.4	0.15	1.0		U	15.1	0.60	97	83-117	80-120
Uranium 238	18.4	1.5	0.71	1.0		U	20.2	0.81	91	86-114	80-120
Neptunium 237	15.6	0.82	0.026	1.0		NP	19.9	0.80	<u>78</u>	90-110	80-120
Plutonium 238	22.6	2.2	0.19	1.0		PU	24.4	0.98	93	84-116	80-120
Plutonium 239/240	24.4	2.3	0.19	1.0		PU	26.4	1.1	92	84-116	80-120
Americium 241	18.6	2.1	0.24	1.0		AM	19.0	0.76	98	81-119	80-120
Iodine 129	124	1.4	1.4	2.0		I	116	4.6	107	83-117	80-120
Cobalt 60	3.64	0.15	0.068	0.050		GAM	3.37	0.13	108	74-126	80-120
Cesium 137	3.87	0.12	0.069	0.10		GAM	3.33	0.13	116	73-127	80-120

200-PW-2/200-PW-4 OU - Borehole Soil

QC-LCS 44992		
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LAB CONTROL SAMPLES
Page 1
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Page 11

7538-004

DUPLICATE

B161C2

SDG 7538		Client/Case no <u>Hanford</u> <u>SDG H2264</u>
Contact Melissa C. Mannion		Contract No. 630
DUPLICATE	ORIGINAL	
Lab sample id <u>R306068-04</u>	Lab sample id <u>R306068-01</u>	Client sample id <u>B161C2</u>
Dept sample id <u>7538-004</u>	Dept sample id <u>7538-001</u>	Location/Matrix 216-B-12 (C3246) SOLID
	Received <u>06/13/03</u>	Collected/Weight 06/11/03 09:25 258.7 g
% solids <u>97.4</u>	% solids <u>97,4</u>	Custody/SAF No F03-006-189 F03-006

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI~ FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ PROT TOT LIMIT
Tritium	7.45	0.29	0.22	400	·	Н	7.51	0.31	0.25		1	23
Carbon 14	-0.157	1.1	1.8	50	U	С	-0.588	1.1	2.0	U	-	
Nickel 63	-0.112	1.4	2.3	30	U	NI_L	-0.738	1.4	2.3	U	-	
Total Strontium	0.101	0.18	0.34	1.0	U	SR	-0.014	0.16	0.34	U	-	
Technetium 99	0.150	0.26	0.57	15	U	TC	0.362	0.29	0.62	U	-	
Thorium 228	0.393	0.17	0.19			TH	0.398	0.17	0.13		1	92
Thorium 230	0.358	0.21	0.29	1.0		TH	0.190	0.17	0.31	U	61	148
Thorium 232	0.392	0.17	0.13	1.0		TH	0.432	0.17	0.13		10	88
Total Uranium (ug/g)	2.85	0.33	0.042	1.0		U_T	2.89	0.34	0.042		1	31
Uranium 233/234	0.926	0.26	0.14	1.0		U	1.10	0.28	0.13		17	.58
Uranium 235	0.067	0.090	0.17	1.0	U	U	0.042	0.083	0.16	U	-	
Uranium 238	1.11	0.30	0.14	1.0		υ	0.996	0.28	0.13		11	59
Neptunium 237	0.004	0.008	0.011	1.0	U	NP	0.008	0.023	0.043	U	-	
Plutonium 238	0.053	0.054	0.20	1.0	U	PU	0	0.055	0.21	U	-	
Plutonium 239/240	0	0.053	0.20	1.0	U	₽U	0.083	0.11	0.21	U	-	
Americium 241	-0.030	0.059	0.23	1.0	U	AM	-0.032	0.064	0.25	U	_	
Iodine 129	0.523	0.38	0.84	2.0	U	1	0.042	0.53	1.2	U	-	
Potassium 40	15.2	0.80	0.43			GAM	15.8	1.6	0.83		4	36
Cobalt 60	U		0.040	0.050	U	GAM	U		0.093	U	-	
Tin 126	U		0.12		U	GAM	U		0.12	U	-	
Cesium 134	U		0.048		Ų	GAM	U		0.11	U	-	
Cesium 137	U		0.035	0.10	U	GAM	U		0.081	U	-	
Radium 226	0.427	0.079	0.077			GAM	0.383	0.15	0.17		11	70
Radium 228	0.764	0.16	0.14			GAM	0.584	0.25	0.28		27	73
Europium 152	U		0.089	0.10	U	GAM	U		0.19	υ	-	
Europium 154	U		0.12	0.10	U	GAM	U		0.30	U	-	
Europium 155	U		0.073	0.10	U	GAM	U		0.18	U	-	
Thorium 228	0.619	0.045	0.037			GAM	0,709	0.096	0.088		14	40

200-PW-2/200-PW-4 OU - Borehole Soil

DUPLICATES
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SUMMARY DATA SECTION
Page 12

7538-004

DUPLICATE, cont.

B161C2

SDG 7538		Client/Case no <u>Hanford</u> SDG H2264
Contact <u>Melissa C. Mannion</u>		Contract <u>No. 630</u>
DUPLICATE	ORIGINAL	
Lab sample id <u>R306068-04</u>	Lab sample id <u>R306068-01</u>	Client sample id <u>B161C2</u>
Dept sample id <u>7538-004</u>	Dept sample id <u>7538-001</u>	Location/Matrix <u>216-B-12 (C3246)</u> <u>SOLID</u>
	Received <u>06/13/03</u>	Collected/Weight <u>06/11/03 09:25</u> <u>258.7 g</u>
% solids <u>97.4</u>	% solids <u>97.4</u>	Custody/SAF No F03-006-189 F03-006

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ τοτ ι	PROT
Thorium 232	0.764	0.16	0.14			GAM	0.584	0.25	0.28		27	73	
Uranium 235	บ		0.12		U	GAM	U		0.30	U	-		
Uranium 238	υ		5.0		U	GAM	U		12	U	-		
Americium 241	U		0.076		U	GAM	U		0.21	υ	-		

200-PW-2/200-PW-4 OU - Borehole Soil

QC-DUP#1 44994	

DUPLICATES
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7538-005

MATRIX SPIKE

B161C2

SDG 7538 Contact Melissa C. Mannion		Client/Case no <u>Hanford SDG H2264</u> Contract No. 630
MATRIX SPIKE	ORIGINAL	
Lab sample id <u>R306068-05</u>	Lab sample id <u>R306068-01</u>	Client sample id <u>B161C2</u>
Dept sample id <u>7538-005</u>	Dept sample id <u>7538-001</u>	Location/Matrix 216-B-12 (C3246) SOLID
	Received <u>06/13/03</u>	Collected/Weight <u>06/11/03 09:25</u> <u>258.7 g</u>
% solids <u>97.4</u>	% solids <u>97.4</u>	Custody/SAF No <u>F03-006-189</u> <u>F03-006</u>

ANALYTE	SPIKE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS						REC 3σ LMTS % (TOTAL)	
Tritium	52.7	0.74	0.25	400	х	Н	50.3	2.0	7.51	0.31	90 83-117	60-140

200-PW-2/200-PW-4 OU - Borehole Soil

QC-MS#1	44995			

MATRIX SPIKES
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7538-001

DATA SHEET

B161C2

	7538 Melissa C. Mannion	Client/Case no Contract	
Lab sample id Dept sample id Received % solids	7538-001 06/13/03		216-B-12 (C3246) SOLID 06/11/03 09:25 258.7 q

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	7.51	0.31	0.25	400		H
Carbon 14	14762-75-5	-0.588	1.1	2.0	50	U	C
Nickel 63	13981-37-8	-0.738	1.4	2.3	30	Ū	$\mathtt{NI}_{\mathtt{L}}$
Total Strontium	SR-RAD	-0.014	0.16	0.34	1.0	U	SR
Technetium 99	14133-76-7	0.362	0.29	0.62	15	บ	TC
Thorium 228	14274-82-9	0.398	0.17	0.13			TH
Thorium 230	14269-63-7	0.190	0.17	0.31	1.0	ប	TH
Thorium 232	TH-232	0.432	0.17	0.13	1.0		TH
Total Uranium (ug/g)	7440-61-1	2.89	0.34	0.042	1.0		$\mathtt{U}_{-}\mathtt{T}$
Uranium 233/234	U-233/234	1.10	0.28	0.13	1.0		υ¯
Uranium 235	15117-96-1	0.042	0.083	0.16	1.0	U	U
Uranium 238	U-238	0.996	0.28	0.13	1.0		υ.
Neptunium 237	13994-20-2	0.008	0.023	0.043	1.0	ប	NP
Plutonium 238	13981-16-3	0	0.055	0.21	1.0	ប	PU
Plutonium 239/240	PU-239/240	0.083	0.11	0.21	1.0	U	ΡÜ
Americium 241	14596-10-2	-0.032	0.064	0.25	1.0	ប	AM
Iodine 129	15046-84-1	0.042	0.53	1.2	2.0	ប	I
Potassium 40	13966-00-2	15.8	1.6	0.83			GAM
Cobalt 60	10198-40-0	U		0.093	0.050	U	GAM
Tin 126	15832-50-5	U		0.12		ប	GAM
Cesium 134	13967-70-9	Ū		0.11		ប	GAM
Cesium 137	10045-97-3	U		0.081	0.10	U	GAM
Radium 226	13982-63-3	0.383	0.15	0.17			GAM
Radium 228	15262-20-1	0.584	0.25	0.28			GAM
Europium 152	14683-23-9	Ų		0.19	0.10	ប	GAM
Europium 154	15585-10-1	U		0.30	0.10	U	GAM
Europium 155	14391-16-3	ប		0.18	0.10	U	GAM
Thorium 228	14274-82-9	0.709	0.096	0.088			GAM

200-PW-2/200-PW-4 OU - Borehole Soil

DATA SHEETS
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7538-001

DATA SHEET, cont

B161C2

	7538 Melissa C. Mannion	Client/Case no Contract		
Į.		Collected/Weight	B161C2 216-B-12 (C3246) SOLID 06/11/03 09:25 258.7 q F03-006-189 F03-006	<u> </u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Thorium 232	TH-232	0.584	0.25	0.28			GAM
Uranium 235	15117-96-1	ប		0.30		U	GAM
Uranium 238	U-238	Ŭ		12		U	GAM
Americium 241	14596-10-2	Ŭ		0.21		υ	GAM

200-PW-2/200-PW-4 OU - Borehole Soil

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SAMPLE DELIVERY GROUP H2264

Test AM Matrix SOLID
SDG 7538
Contact Melissa C. Mannion

LAB METHOD SUMMARY

AMERICIUM 241 IN SOIL
ALPHA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H2264

RESULTS

LAB	RAW SUF-		Americium	
SAMPLE ID	TEST FIX PLANCHET	CLIENT SAMPLE ID	241	
Preparation	n batch 7071-086			
R306068-01	7538-001	B161C2	U	
R306068-02	7538 -002	LCS (QC ID=44992)	ok	
R306068-03	7538-003	BLK (QC ID=44993)	U	
R306068-04	7538-004	Duplicate (R306068-01)	- u	

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF- FIX CLI	NT S	AMPLE ID	MDA pCi/g	*****	PREF FAC	DILU-	YIELD %				 	PREPARED	ANAL- YZED	DETECTOR
Preparation	batch	7071-086	5	2σ prep error	5.0 %	Reference	Lab	Notebool	k 7071	pg.	086					
R306068-01		8161	C2		0.25	0.500			70		111		40	07/21/03	07/21	ss-028
R306068-02		LCS	(QC	ID=44992)	0.24	0.500			73		111			07/21/03	07/21	SS-029
R306068-03		BLK	(QC	ID=44993)	0.26	0.500			69		113			07/21/03	07/21	SS-042
R306068-04		Dupl		e (R306068-01) ID=44994)	0.23	0.500			79		113		40	07/21/03	07/21	SS-051
Nominal valu	Jes an	d limits	from	method	1.0	0.500			20-10	5	100	100	 180		•	

	PROCEDURES	REFERENCE	AMCMISO_IE_PLATE_AEA
-		CP-060	Soil Preparation, rev 4
		CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2
		CP-963	Americium and Curium in Water and Dissolved
	ı		Samples by Extraction Chromatography, rev 3
		CP-008	Heavy Element Electroplating, rev 7

METHOD SUMMARIES
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SUMMARY DATA SECTION
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SAMPLE DELIVERY GROUP H2264

Test NP Matrix SOLID
SDG 7538
Contact Melissa C. Mannion

LAB METHOD SUMMARY

NEPTUNIUM IN SOIL ALPHA SPECTROSCOPY

Client <u>Hanford</u>
Contract <u>No. 630</u>
Contract <u>SDG H2264</u>

RESULTS

	I SUF- IT FIX PLANCHET	CLIENT SAMPLE ID	Neptunium 237
Preparation bat	ch 7071-086		···········
R306068-01	7538-001	B161C2	U
R306068-02	7538-002	LCS (QC ID=44992)	<u>LOW</u>
R306068-03	7538-003	BLK (QC ID=44993)	U
R306068-04	7538-004	Duplicate (R306068-01)	- U

METHOD PERFORMANCE

LAB SAMPLE ID	RAW S	SUF- FIX CLIE	NT S	AMPLE	E ID	MDA pCi/		AL IQ 9	PREP	DILU-	YIELD %			 DRIFT KeV		PREPARED	ANAL- YZED	DETECTOR
Preparation	batch	7071-086	5	2σ μ	prep error	5.0 %	Ref	ference	Lab	Notebool	7071	pg.	086					
R306068-01		B161	C2			0.0	43	0.500			62		1045		41	07/22/03	07/22	ss-028
R306068-02		LCS	(QC	ID=44	4992)	0.0	26	0.500			71		1046			07/22/03	07/22	SS-029
R306068-03		BLK	(QC	ID=44	4993)	0.0	42	0.500			66		1052			07/22/03	07/22	SS-042
R306068-04					306068-01) 4994)	0.0	11	0.500			65		1052		41	07/22/03	07/22	SS-051
Nominal valu	ues and	limits	from	meth	nod	1.0		0.500			20-10	5	100	 	180			

	CP-008	Chromatography, rev 0 Heavy Element Electroplating, rev 7
	CP-930	Neptunium from Solids and Water by Extraction
	CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2
PROCEDURES	REFERENCE CP-060	NP237_LLE_PLATE_AEA Soil Preparation, rev 4

AVERAGES ± 2 SD MDA 0.030 ± 0.030 FOR 4 SAMPLES YIELD 66 ± 7

METHOD SUMMARIES
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SAMPLE DELIVERY GROUP #2264

Test	PU Matrix SOLID
SDG	7538
Contact	Melissa C. Mannion

LAB METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS
ALPHA SPECTROSCOPY

Client	Hanford
Contract	No. 630
Contract	SDG_H2264

RESULTS

	RAW SUF- TEST FIX PLANCHET	CLIENT SAMPLE ID	Plutonium 238	Plutonium 239/240	
Preparation	batch 7071-086				
R306068-01	7538-001	B161C2	U	υ	
R306068-02	7538-002	LCS (QC ID=44992)	ok	ok	
R306068-03	7538-003	BLK (QC ID=44993)	U	U	
R306068-04	7538-004	Duplicate (R306068-01)	- U	- ປ	

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST		LIENT	SAMPLE ID		MAX MC pCi/g		PREI FAC	DIEU-	YIELD %		COUNT min	FWHM keV	 	PREPARED	ANAL - YZED	DETECTOR
Preparation	batch	7071-	086	2ø prep ei	rror	5.0 %	Reference	Lab	Notebool	7071	pg.	086					
R306068-01		8	161C2			0.21	0.500			72		126		42	07/22/03	07/23	ss-028
R306068-02		L	CS (QC	ID=44992)		0.19	0.500			80		127			07/22/03	07/23	ss-029
R306068-03		В	LK (OC	ID=44993)		0.19	0.500			84		128			07/22/03	07/23	ss-042
R306068-04		D	•	te (R306068- ID=44994)	-01)	0.20	0.500			77		128		42	07/22/03	07/23	ss-051
Nominal valu	Jes an	d limi	ts fro	m method		1.0	0.500			20-10	5	100	100	180			

	PROCEDURES	REFERENCE	PUISO_PLATE_AEA
	,	CP-060	Soil Preparation, rev 4
		CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2
		CP-941	Plutonium in Water and Dissolved Samples by
			Extraction Chromatography, rev 1
		CP-008	Heavy Element Electroplating, rev 7
ij			

AVERAGES ± 2 SD MDA 0.20 ± 0.019
FOR 4 SAMPLES YIELD 78 ± 10

METHOD SUMMARIES
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SAMPLE DELIVERY GROUP H2264

Test TH Matrix SOLID
SDG 7538
Contact Melissa C. Mannion

LAB METHOD SUMMARY

THORIUM, ISOTOPIC IN SOIL
ALPHA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H2264

RESULTS

RAW SUF-LAB Thorium 230 SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Preparation batch 7071-086 7538-001 B161C2 U R306068-01 R306068-02 7538-002 LCS (QC ID=44992) ok R306068-03 7538-003 BLK (QC ID=44993) U 7538-004 Duplicate (R306068-01) ok R306068-04 Nominal values and limits from method RDLs (pCi/g) 1.0 200-PW-2/200-PW-4 OU - Borehole Soil

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST		CLIENT	SAMPLE ID	MAX MD pCi/g		PREP FAC	DILU- TION	YIELD %	EFF %		FWHM keV	 	PREPARED	ANAL- YZED	DETECTOR
Preparation	batch	7071	-086	2σ prep erro	or 5.0 %	Reference	Lab	Noteboo	k 7071	pg.	086					<u> </u>
R306068-01			B161C2		0.31	0.250			92		316		42	07/22/03	07/23	SS-028
R306068-02			LCS (Q	ID=44992)	0.32	0.250			90		316			07/22/03	07/23	SS-029
R306068-03			BLK (Q	ID=44993)	0.32	0.250			87		318			07/22/03	07/23	SS-042
R306068-04		ĺ		ate (R306068-0° C ID=44994)	0.29	0.250			89		318		42	07/22/03	07/23	ss-052
Nominal valu	ues an	d lim	its fro	on method	1.0	0.250			20-10	5	150		 180			

PROCEDURES	REFERENCE	THISO_IE_PLATE_AEA
ļ	CP-060	Soil Preparation, rev 4
}	CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2
	CP~900	Thorium in Water and Dissolved Solid Samples by
		Extraction Chromatography, rev 1
	CP-008	Heavy Element Electroplating, rev 7

AVERAGES ± 2 SD MDA 0.31 ± 0.028
FOR 4 SAMPLES YIELD 90 ± 4

METHOD SUMMARIES
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SUMMARY DATA SECTION
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SAMPLE DELIVERY GROUP #2264

Test U____ Matrix SOLID
SDG 7538
Contact Melissa C. Mannion

LAB METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL
ALPHA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H2264

RESULTS

LAB	RAW SUF-		1: Uranjum	2: Uranium	3: Uranium	RESU	LT RAT	105 ((%)
SAMPLE ID	TEST FIX PLANCHET	CLIENT SAMPLE ID	233/234	235	238	1÷3	2σ	2÷3	2σ
Preparation	batch 7071-086								
R306068-01	7538-001	B161C2	1.10	U	0.996	110	42	4	8
R306068-02	7538-002	LCS (QC ID=44992)	ok	ok	ok				
R306068-03	7538-003	BLK (QC ID=44993)	U	U	ប				
R306068-04	7538-004	Duplicate (R306068-01)	ok	- U	ok	83	33	6	8
Nominal val	ues and limits from	method RDLs (pCi/g)	1.0	1.0	1.0	100		4	
200-PW-2/20	0-PW-4 OU - Borehole	Soil				Averages 97		5	

METHOD PERFORMANCE

I.AB SAMPLE ID	RAW TEST		CLIENT	SAMPLE ID	MAX MC pCi/g		PREP FAC	DILU-	YIELD %	EFF %		FWHM keV		PREPARED	ANAL - YZED	DETECTOR
Preparation	batch	7071	-086	2σ prep error	5.0 %	Reference	Lab	Notebool	7071	 рд.	086					
R306068-01			B161C2		0.16	0.500			83		177		41	07/22/03	07/22	ss-028
R306068-02			LCS (QC	: ID=44992)	0.74	0.500			87		178			07/22/03	07/22	ss-029
R306068-03			BLK (QC	: ID=44993)	0.18	0.500			80		176			07/22/03	07/22	SS-062
R306068-04			•	te (R306068-01) : ID=44994)	0.17	0.500			81		175		41	07/22/03	07/22	ss-042
Nominal valu	Jes an	d lim	its fro	m method	1,0	0.500			20-10	5	100	100	180		-	

ı	PROCEDURES	REFERENCE	UISO_PLATE_AEA
ı		CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2
ı		CP-921	Uranium in Water and Dissolved Samples by
ĺ			Extraction Chromatography, rev 0
		CP-008	Heavy Element Electroplating, rev 7
l			

 AVERAGES ± 2 SD
 MDA
 0.31
 ±
 0.57

 FOR 4 SAMPLES
 YIELD
 83
 ±
 6

METHOD SUMMARIES
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SAMPLE DELIVERY GROUP H2264

Test <u>SR</u> Matrix <u>SOLID</u>
SDG <u>7538</u>
Contact <u>Melissa C. Mannion</u>

LAB METHOD SUMMARY

TOTAL STRONTIUM IN SOIL
BETA COUNTING

Client Hanford
Contract No. 630
Contract SDG H2264

RESULTS

Preparation batch	7071-086			
R306068-01	7538-001	B161C2	U	
R306068-02	7538-002	LCS (QC ID=44992)	ok	
R306068-03	7538-003	BLK (QC ID=44993)	U	
R306068-04	7538-004	Duplicate (R306068-01)	- U	

METHOD PERFORMANCE

LAB SAMPLE ID	RAW Test	SUF- FIX C	LIENT	SAMPL	E ID	MDA pCi/	ALIQ g g	PREP FAC	DILU-	YIELD %	EFF %		FWHM keV	 	PREPARED	ANAL- YZED	DETECTOR
Preparation	batch	7071-	086	2σ	prep error	10.0 %	Reference	Lab	Notebool	c 7071	pg.	086		 			
R306068-01		В	161C2			0.34	1.00			98		100		37	07/18/03	07/18	GRB-218
R306068-02		LO	CS (QC	ID=4	4992)	0.34	1.00			79		100			07/18/03	07/18	GRB-217
R306068-03		ВІ	LK (QC	ID=4	4993)	0.44	1.00			75		100			07/18/03	07/18	GRB-221
R306068-04		Di	,	-	306068-01) 4994)	0.34	4 1.00			93		100		37	07/18/03	07/18	GRB-222
Nominal valu	ues an	d limit	ts fro	m met	hod	1.0	1.00			30-10	5	100		180			

PROCEDURES REFERENC	E SRTOT_SEP_PRECIP_GPC
CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2
CP-381	Strontium in Solids, rev 1

AVERAGES ± 2 SD	MDA	0.36	ŧ	0.10
FOR 4 SAMPLES	YIELD .	86	±	

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SAMPLE DELIVERY GROUP H2264

Test IC Matrix SOLID
SDG 7538
Contact Melissa C. Mannion

LAB METHOD SUMMARY

TECHNETIUM 99 IN SOIL
BETA COUNTING

Client Hanford
Contract No. 630
Contract SDG H2264

RESULTS

Preparation bate	th 7071-086				
R306068-01	7538-001	B161C2	U		
R306068-02	7538-002	LCS (QC ID=44992)	ok		•
R306068-03	7538-003	BLK (QC ID=44993)	U		
R306068-04	7538-004	Duplicate (R306068-01)	- U		

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST		CLIEN	IT S/	AMPLE ID		MDA pCi/s	ALIQ 9		P DILU- C TION	YIELD		COUNT	FWHM keV	 	PREPARED	ANAL - YZED	DETECTOR
Preparation	batch	707	1-086		2ø prep eri	ror 1	10.0 %	Reference	e Lab	Noteboo	k 7071	pg.	086		•		_	
R306068-01			B1610	2			0.62	1.02			80		50		47	07/22/03	07/28	GRB-222
R306068-02			LCS (QC I	(D=44992)		0.57	1.00			90		50			07/22/03	07/25	GRB-218
R306068-03			BLK (QC 1	D=44993)		0.56	1.00			91		50			07/22/03	07/26	GRB-203
R306068-04					R306068-0 D=44994)	01)	0.57	1.02			85		50		44	07/22/03	07/25	GRB-220
Nominal valu	ues ar	nd lin	nits f	rom	method		15	1.00			20-10	5	50		180			

PROCEDURES	REFERENCE	TC99 TR SEP LSC
	CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2
	CP-021	Preparation of Tc-99m Tracer, rev 2
	CP-002	Q.C. Preparation, rev 4
	CP-003	Addition of Carriers and Tracers, rev 5
	CP-542	Technetium-99 Purification (Soil) by Extraction
		Chromatography, rev 2
	CP-008	Heavy Element Electroplating, rev 7

AVERAGES ± 2 SD	MDA _	0.58	±	0.054
FOR 4 SAMPLES	YIELD _	86	± .	10

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SAMPLE DELIVERY GROUP H2264

Test GAM Matrix SOLID

SDG 7538

Contact Melissa C. Mannion

LAB METHOD SUMMARY

GAMMA SCAN
GAMMA SPECTROSCOPY

Client <u>Hanford</u>
Contract <u>No. 630</u>
Contract <u>SDG H2264</u>

RESULTS

RAW SUF-SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Cobalt 60 Cesium 137 Preparation batch 7071-086 R306068-01 7538-001 B161C2 П U R306068-02 75**38**-002 LCS (QC ID=44992) ok ok BLK (QC ID=44993) R306068-03 7538-003 U U R306068-04 7538-004 Duplicate (R306068-01) U Nominal values and limits from method RDLs (pCi/g) 0.050 0.10 200-PW-2/200-PW-4 OU - Borehole Soil

METHOD PERFORMANCE

LAB SAMPLE ID	RAW S		SAMPLE IÐ	MDA pCi/g	ALIQ 9	PREF	DILU-	YIELD %			DRIFT KeV		PREPARED	ANAL - YZED	DETECTOR
Preparation	batch	7071-086	2σ prep error	15.0 % R	Reference	Lab	Notebool	7071	pg.	086					
R306068-01		B161C2		0.69	69.7					461		16	06/26/03	06/27	PD,03,00
R306068-02		LCS (QC	ID=44992)	0.068	69.7					484			06/26/03	06/27	PD,04,00
R306068-03		BLK (QC	ID=44993)	0.42	69.7					792			06/26/03	06/28	PD,03,00
R306068-04		•	te (R306068-01) : ID=44994)	0.29	69.7					768		17	06/26/03	06/28	PD,04,00
Nominal val	ues and	limits fro	m method	0.050	69.7					100		180	_		

PROCEDURES	REFERENCE	GAMMA_GS
	CP-060	Soil Preparation, rev 4
	CP-100	Ge(Li) Preparation for Commercial Samples, rev 5

AVERAGES ± 2 SD MDA 0.37 ± 0.52
FOR 4 SAMPLES YIELD ±

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SAMPLE DELIVERY GROUP H2264

Test I Matrix SOLID SDG 7538 Contact Melissa C. Mannion

LAB METHOD SUMMARY

IODINE 129 IN SOIL GAMMA SPECTROSCOPY

Client <u>Hanford</u> Contract No. 630 Contract SDG H2264

RESULTS

RAW SUF-LAB

CLIENT SAMPLE ID Lodine 129 TEST FIX PLANCHET SAMPLE ID

Preparation batch 7071-086 R306068-01 7538-001

B161C2 7538-002 LCS (QC ID=44992) R306068-02 ok 7538-003 BLK (QC ID=44993) R306068-03 IJ

R306068-04 7538-004 Duplicate (R306068-01)

Nominal values and limits from method 200-PW-2/200-PW-4 OU - Borehole Soil

RDLs (pCi/g)

2.0

u

METHOD PERFORMANCE

RAW SUF-MDA ALIQ PREP DILU- YIELD EFF COUNT FWHM DRIFT DAYS ANAL-LAB TEST FIX CLIENT SAMPLE ID pCi/g SAMPLE ID FAC TION × min keV KeV HELD PREPARED YZED DETECTOR

Preparation batch 7071-086 2σ prep error 10.0 % Reference Lab Notebook 7071 pg. 086 R306068-01 B161C2 1.2 1.02 56 707 43 07/22/03 07/24 XSPEC-004 R306068-02 LCS (QC ID=44992) 1.00 92 612 1.4 07/22/03 07/28 XSPEC-004 R306068-03 BLK (QC 1D=44993) 0.72 1.00 92 623 07/22/03 07/25 XSPEC-004 R306068-04 Duplicate (R306068-01) 0.84 1.02 47 1321 44 07/22/03 07/25 XSPEC-004 (QC ID=44994)

Nominal values and limits from method 2,0 1.00 20-105 300 180

PROCEDURES REFERENCE I 129_SEP_LEPS_GS

CP-024 Iodine-129, Sample Dissolution, rev 3

CP-530 Iodine-129 Purification, rev 0 AVERAGES ± 2 SD MDA 1.0 ± 0.63 FOR 4 SAMPLES YIELD 72 ± 47

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Lab id EBRLNE Protocol <u>Hanford</u> Version Ver 1.0 Form DVD-LMS Version 3.06 Report date <u>08/04/03</u>

SAMPLE DELIVERY GROUP H2264

Test <u>U T</u> Matrix <u>SOLID</u> SDG <u>7538</u> Contact <u>Melissa C. Mannion</u>

LAB METHOD SUMMARY

URANIUM, TOTAL IN SOIL KINETIC PHOSPHORIMETRY (KPA)

Client	Hanford	
Contract	No. 630	
Contract	SDG H2264	

RESULTS

Preparation batc	n 7071-086			
R306068-01	7538-001	B161C2	2.89	
R306068-02	7538-002	LCS (QC ID=44992)	ok	
R306068-03	75 3 8-003	BLK (QC 1D=44993)	U	
R306068-04	7538 -004	Duplicate (R306068-01)	ok	

METHOD PERFORMANCE

LAB SAMPLE ID	RAW S		SAMPLE ID	MDA ug/g	ALIQ g		DILU-	YIELD %			FWHM keV	 	PREPARED	ANAL- YZED	DETECTOR
Preparation	batch	7071-086	2σ prep error	9.0 % R	eference	Lab	Notebool	7071	pg.	086			· <u>·</u>		
R306068-01		B161C2		0.042	0.100							22	07/03/03	07/03	KPA-001
R306068-02		LCS (C	C ID=44992)	0.042	0.100								07/03/03	07/03	KPA-001
R306068-03		BLK (C	C ID=44993)	0.004	0.100								07/03/03	07/03	KPA-001
R306068-04		•	ate (R306068-01) C ID=44994)	0.042	0.100							22	07/03/03	07/03	KPA-001
Nominal valu	ues and	limits fr	om method	1.0	0.100							 180			

	PROCEDURES	REFERENCE	UTOT_KPA
		CP-060	Soil Preparation, rev 4
		CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2
		CP-044	Sample Preparation for Total Uranium by Kinetic
			Phosphorimetry, rev 4
		CP-928	Total Uranium by Kinetic Phosphorimetry, rev 5
-			

AVERAGES ± 2 SD MDA 0.032 ± 0.038 FOR 4 SAMPLES YIELD ± ______ ±

METHOD SUMMARIES
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SAMPLE DELIVERY GROUP H2264

Test C Matrix SOLID SDG 7538 Contact Melissa C. Mannion

LAB METHOD SUMMARY CARBON 14 IN SOIL

LIQUID SCINTILLATION COUNTING

Client <u>Hanford</u> Contract No. 630 Contract SDG H2264

RESULTS

RAW SUF-T.AB

TEST FIX PLANCHET CLIENT SAMPLE ID Carbon 14 SAMPLE ID Preparation batch 7071-086

7538-001 B161C2 U R306068-01 7538-002 LCS (QC ID=44992) ok R306068-02 R306068-03 7538-003 BLK (QC ID=44993) U 7538-004 Duplicate (R306068-01) R306068-04

Nominal values and limits from method 200-PW-2/200-PW-4 OU - Borehole Soil

RDLs (pCi/g)

50

U

METHOD PERFORMANCE

RAW SUF-ALIQ PREP DILU- YIELD EFF COUNT FWHM DRIFT DAYS ANAL-LAB MDA TEST FIX CLIENT SAMPLE ID FAC TION % min keV KeV HELD PREPARED YZED SAMPLE ID pCi/g DETECTOR Preparation batch 7071-086 2σ prep error 10.0 % Reference Lab Notebook 7071 pg. 086 R306068-01 2.0 0.431 100 37 07/16/03 07/18 LSC-005 R306068-02 LCS (QC ID=44992) 6.2 0.431 100 07/16/03 07/18 LSC-005 <u> 11</u> R306068-03 BLK (QC 1D=44993) 2.0 0.431 100 100 07/16/03 07/18 LSC-005 R306068-04 Duplicate (R306068-01) 1.8 0.474 100 100 37 07/16/03 07/18 LSC-005 (QC ID=44994) Nominal values and limits from method 50 0.431 50 180

PROCEDURES REFERENCE C14_COX_LSC

CP-251 Tritium/Carbon-14 Oxidation, rev 5 AVERAGES ± 2 SD MDA <u>3.0</u> ± <u>4.3</u> FOR 4 SAMPLES YIELD 100 ± 0

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SAMPLE DELIVERY GROUP H2264

Test H Matrix SOLID
SDG 7538
Contact Melissa C. Mannion

LAB METHOD SUMMARY

TRITIUM IN SOIL
LIQUID SCINTILLATION COUNTING

Client Hanford
Contract No. 630
Contract SDG H2264

RESULTS

RAW SUF-LAB Tritium CLIENT SAMPLE ID SAMPLE ID TEST FIX PLANCHET Preparation batch 7071-086 R306068-01 7538-001 B161C2 7.51 R306068-02 7538-002 LCS (QC ID=44992) ok R306068-03 7538-003 BLK (QC ID=44993) U Duplicate (R306068-01) ok 7538-004 R306068-04 R306068-05 7538-005 Spike (R306068-01) ok Χ Nominal values and limits from method RDLs (pCi/g) 400 200-PW-2/200-PW-4 OU - Borehole Soil

METHOD PERFORMANCE

LAB SAMPLE ID	RAW SUF- TEST FIX	CLIENT	SAMPLE ID	MDA pCi/g	ALIQ 9	PREP	DILU-	YIELD %		COUNT min		DRIFT KeV		PREPARED	ANAL- YZED	DETECTOR
Preparation	batch 7071	-086	2σ prep error	10.0 %	Reference	Lab	Noteboo	k 7071	pg.	086	-			· _		
R306068-01		B161C2		0.25	20.6			35		120			43	07/24/03	07/24	LSC-007
R306068-02		LCS (QC	ID=44992)	0.26	20.0			33		120				07/24/03	07/24	LSC-007
R306068-03		BLK (QC	1D=44993)	0.26	20.0			33		120				07/24/03	07/25	LSC-007
R306068-04			te (R306068-01) ID=44994)	0.22	21.9			35		120			44	07/24/03	07/25	LSC-007
R306068-05		,	R306068-01) ID=44995)	0.25	20.6			35		120			44	07/24/03	07/25	LSC-007
Nominal valu	ues and lim	its fro	m method	400	20.0	_				25			180			

PROCEDURES REFERENCE 906.0_H3_LSC

CP-216 Tritium in Solid Samples by Azeotropic
Distillation, rev 6

AVERAGES ± 2 SD MDA 0.25 ± 0.033 FOR 5 SAMPLES YIELD 34 ± 2

METHOD SUMMARIES
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SAMPLE DELIVERY GROUP H2264

Test NI L Matrix SOLID SDG 7538 Contact Melissa C. Mannion

LAB METHOD SUMMARY

NICKEL 63 IN SOIL LIQUID SCINTILLATION COUNTING

Client Hanford Contract No. 630 Contract SDG H2264

RESULTS

RAW SUF-T.AR

Nickel 63 SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID

Preparation batch 7071-086

R306068-01 7538-001 7538-002 R306068-02

B161C2 LCS (QC ID=44992)

ok

R306068-03 R306068-04

7538-003 7538-004 BLK (QC ID=44993) Duplicate (R306068-01)

U

LAB

Nominal values and limits from method

RDLs (pCi/g)

MDA

2.3

30

30

200-PW-2/200-PW-4 OU - Borehole Soil

METHOD PERFORMANCE

RAW SUF-

TEST FIX CLIENT SAMPLE ID SAMPLE ID pCi/g

ALIQ PREP DILU- YIELD EFF COUNT FWHM DRIFT DAYS

ANAL-DETECTOR

FAC TION % min keV KeV HELD PREPARED YZED

Preparation batch 7071-086 2σ prep error 10.0 % Reference Lab Notebook 7071 pg. 086

R306068-01 2.3 R306068-02 LCS (QC ID=44992) 2.4 2.0 0.500 0.500 100 37 07/18/03 07/18 LSC-004

R306068-03 BLK (QC ID=44993)

07/18/03 07/19 LSC-004

R306068-04 Duplicate (R306068-01)

0.500 0.500 100 07/18/03 07/19 LSC-004 100 38 07/18/03 07/19 LSC-004

(QC ID=44994)

0.500

30-105

100

95

180

PROCEDURES REFERENCE NI63_LSC

Nominal values and limits from method

CP-060

Soil Preparation, rev 4

CP-071

Soil Dissolution, > 1.0g Aliquot, rev 2

CP-281

Nickel-63 Purification By Extraction

Chromatography, rev 0

AVERAGES ± 2 SD FOR 4 SAMPLES

74

50

MDA 2.2 ± 0.35 YIELD 96 ± 10

Lab id EBRLNE

Protocol <u>Hanford</u>

Version Ver 1.0

Form DVD-LMS

Version <u>3.06</u> Report date 08/04/03

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SAMPLE DELIVERY GROUP H2264

SDG 7538
Contact Melissa C. Mannion

REPORT GUIDE

Client	Hani	Ford	
Contract	No.	630	
Case no	SDG	H2264	

SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

- * LAB SAMPLE ID is the lab's primary identification for a sample.
- * DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.
- * CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.
- * QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.
 - QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.
- * All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

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SAMPLE DELIVERY GROUP H2264

SDG 7538
Contact Melissa C. Mannion

REPORT GUIDE

Client	Hanfor	d	
Contract	No. 63	0	
Case no	SDG H2	264	

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

- * The preparation batches are shown in the same order as the Method Summary Reports are printed.
- * Only analyses of planchets relevant to the SDG are included.
- * Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
- * The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

These qualifiers should be reviewed as follows:

- X Some data has been manually entered or modified. Transcription errors are possible.
- P One or more results are 'preliminary'. The data is not ready for final reporting.
- There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

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SAMPLE DELIVERY GROUP H2264

SDG <u>7538</u>
Contact <u>Melissa C. Mannion</u>

REPORT GUIDE

Client	Hani	ford	
Contract	No.	630	
Case no	SDG	H2264	

WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

- * TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.
- * SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.
- * The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.
- * PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.
- * For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.
- * The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

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SAMPLE DELIVERY GROUP H2264

SDG 7538
Contact Melissa C. Mannion

REPORT GUIDE

Client	Hanford	
Contract	No. 630	
Case no	SDG H2264	

DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

- * TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.
- * The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

- * ERRORs can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.
- * A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.
- * When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

U The RESULT is less than the MDA (Minimum Detectable Activity).

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SAMPLE DELIVERY GROUP H2264

SDG <u>7538</u>
Contact <u>Melissa C. Mannion</u>

GUIDE, cont.

Client	Hanford
Contract	No. 630
Case no	SDG H2264

DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

- J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.
- B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

- L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.
- H Similar to 'L' except the recovery was high.
- P The RESULT is 'preliminary'.
- X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.
- 2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

* An MDA is underlined if it is bigger than its RDL.

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SAMPLE DELIVERY GROUP H2264

SDG <u>7538</u>
Contact <u>Melissa C. Mannion</u>

GUIDE, cont.

Client	Hanford		
Contract	No.	630	
Case no	SDG	H2264	

DATA SHEET

- * An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.
- * A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.
- * When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

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SAMPLE DELIVERY GROUP H2264

SDG <u>7538</u> Contact <u>Melissa C. Mannion</u>

REPORT GUIDE

Client	Hanford		
Contract	No.	630	
Case no	SDG	H2264	

LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

- * All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.
- * An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- * REC (Recovery) is RESULT divided by ADDED expressed as a percent.
- * The first, computed limits for the recovery reflect:
 - 1. The error of RESULT, including that introduced by rounding the result prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

- 2. The error of ADDED.
- 3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- * The second limits are protocol defined upper and lower QC limits for the recovery.
- * The recovery is underlined if it is outside either of these ranges.

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SAMPLE DELIVERY GROUP H2264

SDG 7538
Contact Melissa C. Mannion

REPORT GUIDE

Client	Han	ford	
Contract	No.	630	
Case no	SDG	H2264	

DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTs divided by their average expressed as a percent.

If both RESULTs are less than their MDAs, no RPD is computed and a '-' is printed.

For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTs prior to printing.

If this limit is labeled TOT, it includes the preparation error in the RESULTs. If labeled CNT, it does not.

This value reported for this limit is at most 999.

- * The second limit for the RPD is the larger of:
 - 1. A fixed percentage specified in the protocol.

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SAMPLE DELIVERY GROUP H2264

SDG 7538
Contact Melissa C. Mannion

GUIDE, cont.

Client	Hanford	
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DUPLICATE

- 2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.
- * The RPD is underlined if it is greater than either limit.
- * If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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SAMPLE DELIVERY GROUP H2264

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REPORT GUIDE

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MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

- * All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.
 - If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.
- * An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.
 - An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.
- * REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.
- * The first, computed limits for the recovery reflect:
 - 1. The errors of the two RESULTs, including those introduced by rounding them prior to printing.
 - If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.
 - 2. The error of ADDED.
 - 3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- * The second limits are protocol defined upper and lower QC limits

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SAMPLE DELIVERY GROUP H2264

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GUIDE, cont.

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MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

* The recovery is underlined (out of spec) if it is outside either of these ranges.

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SAMPLE DELIVERY GROUP H2264

SDG 7538
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REPORT GUIDE

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METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

The J and X flags are as on the data sheet.

- * Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.
- * Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

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SAMPLE DELIVERY GROUP H2264

SDG 7538
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GUIDE, cont.

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METHOD SUMMARY

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

- * Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.
- * If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

MDAs are underlined if greater than the printed RDL.

- * Aliquots are underlined if less than the nominal value specified for the method.
- * Prepareation factors are underlined if greater than the nominal value specified for the method.
- * Dilution factors are underlined if greater than the nominal value specified for the method.
- * Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.
- * Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.
- * Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

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SAMPLE DELIVERY GROUP H2264

SDG 7538
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GUIDE, cont.

Client	Han	ford	
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METHOD SUMMARY

- * Count times are underlined if less than the nominal value specified for the method.
- * Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.
- * Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.
- * Days Held are underlined if greater than the holding time specified in the protocol.
- * Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1÷3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

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SAMPLE DELIVERY GROUP H2264

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GUIDE, cont.

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METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

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FH-Central Platea	u Project	C	HAIN OF CUST	ODY/S	AMPL	E ANAL	YSIS	REQUEST	:	F03-	-006-189	Page 1	of <u>1</u>	
Collector 6-11-3 Jehnster/Pope/Pfister/Hughes		Comp	any Contact Hulstrom	Telepho 373-3	ne No.		.,.	Project Coording	antor	Price Code 8N		Data Tur	Data Turnaround	
Project Designation 200-PW-2/200-PW-4 OU - B		Sampl	ling Location 5-B-12 (C3246); 197.5-20	00 H2264 (7538) SAF No. F03-006			SAF No.	A	Air Quality 45 I			ays		
Ice Chest No. FRC	99-00-0ZZ	Field HN	Logbook No. IF-N-3361		COA 117504E	OA Method of Shipment 7504ES10 Federal Express								
Shipped To EBERLINE SERVICES (For	merly TMA)	Offsit	e Property No.	ft c	150	292		Bill of Lading/	Air Bill N	. SF	E051	PC_		
POSSIBLE SAMPLE HAZA					T	T								
RADIOACTIVE TIE TO: B171	P5		Preservation	Cool 4C	Coel 4C	None	Cool	4C C00/4C	None	None	None			
 Special Handling and/or S	torage		Type of Container	aG	aG	aG	aC	aG	аG	aG	аG			
1 -	Vone_		No. of Container(s)	1	1	1		1	1	1	1			
}			Volume	60mL	125mL	60mL	1251	nL 60mL	60mL	60mL	60mL			
	SAMPLE ANALYS	is.		See item (1) is Special Instructions.	Special	Section (3) in Special Instructions.	See item Spec Instruc	ial 353.2; Oil &	See item (5) Special Instruction	Special	Tritium - H3			
Sample No.	Matrix *	Sample Date	Sample Time											
B161C2	SOIL	6-11-3	.0925						X	×	×			
							<u> </u>			<u> </u>	ļ			
				<u> </u>	<u> </u>	<u> </u>	 							
			-	 	 -	 								
CHAIN OF POSSESSIO	N	Sign/Prin	nt Names	<u> </u>	SPE	CIAL INSTR	UCTION	ONS	<u> </u>		1,	28 13·3	Matrix *	
Relinquished By/Removed From Relinquished By/Removed From Relinquished By/Removed From LABORATORY Received By SECTION	Deferme 1200 by 2.0) Date/Time 1000 Date/Time	Received By/Str Received By/Str	med in Dr. Section	LOTime 100	17 (1) (2) (3) (3) (4) (5) (5) (5) (24)	hy the lab due to Alcohols, Glyco Serni-VOA - 82 I Dissel Range ICP Metals - 60 Metals - 60 Metals - 60 Metals - 60 IC Anions - 300 I) - 9045; Total Gamma Spectro mas Spec - Adde, Isotopic Pluton Tech - 99, 51	othe radius of the radius of t	tones 2015 (1 But L); Semi VOA 2 A D; TRH Geordes R; Semi VOA (2 dic. E Semi VOA (Antin vide, Dioride, Nine)	MA Diethyl VIA (Add-C Mpr - MATPI Sakum, Cade nony, Beryll c, Nitrite, Pl 50, Buropius 6, Radium-2	ciber, Ethylene- la) {2 Entoxyoth LG mem, Chromium ium, Bismuth, Be hosphate, Saffin n-152, Europium 128, Tin-126}; Te 1614 * (29, A)	typest, Methemans, Tribustyl 5 the Art Scientification, Copper, 1 American Scientification, Copper, 1 American Scientification, Copper, 1 1-154, Europium Marchael Uranium, Marchael Uranium, Marchael Scientification, Copper, 1 Letter 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	oil) sheephate}; m., Silves}; lickel};	S=Soil SE=Sectiment SO=Soil SSI=Standge W = Water O=Oil A=Aair DS=Drum Solids DI=Drum Liquids T=Tissue WI=Wipe L=Liquid V=Vegetation X=Other	
FINAL SAMPLE Disposal M DISPOSITION	CATEDAT				_	Dispo	sed By					Date/Time		

EBERLINE

ANALYTICAL SERVICES GROUP

Richmond, CA Laboratory

SAMPLE RECEIPT CHECKLIST

Client:	FLR	Date/Time received	1000	613	-03
CoC No.	F03-006-189				
Container	1.D. No. C. (-9 9 - 022 Requested TA	r (Days) P.O	. Received	Yes [] No []
	INSPECT	TON			•
1. C	ustody seals on shipping container intact?	Yes [4	No [] 1	V/A [].
2. C	ustody seals on shipping container dated &	signed? Yes [No [] !	V/A []
з. с	ustody seals on sample containers intact?	Yes [LT	No [1 1	V/A[]
4. C	ustody seals on sample containers dated &	signed? Yes [4	No [] [V/A []
5. P	acking material is:	{ Wet[]	Dry [L	<i>}</i>	
6. N	umber of samples in shipping container:				•
7. N	lumber of containers per sample:	3 (Or see CoC)	
8. P	aperwork agrees with samples?	Yes [4	No (]	
9. s	amples have: Tape [] Hazard labels []	Rad labels [4 Appro	priate sar	nple label	s [1-
10. S	amples are: In good condition [Leaki	ng [] Broken Con	tainer []	Missin	g [ˈ]
11. S	amples are: Preserved [] Not preserved	[] Preservative			
12. D	escribe any anomalies:			<u> </u>	
_					
_					
13. W	Vas P.M. notified of any anomalies? Yes I		ite	·	
14. R	ecsived by _ / Lun _ W	Date: 6-13-0	S Time:	-1001	
Customer	Sample C	ustomer Sample			
No	·		cpm	mB/hr	aqiw
RIGIC	240				
					
~					·
					
·		<u>, , , , , , , , , , , , , , , , , , , </u>			·
					
ion Chamb	er Ser. No.	Calibration date			
Alpha Mete	er Ser. No.	Calibration date	·		
	na Meter Ser. No	Calibration date	, 2.	14-03	
			-£ l':-		



Mr. Steve Trent Fluor Hanford Inc. 825 Jadwin Ave. Richland, WA 99352

Subject: Contract No. 630
Analytical Data Package

Dear Mr. Trent:



Enclosed are the hard copy analytical reports for the batch number/fraction indicated (marked X) in the following table:

LvLl Batch #	0306L625
SDG#	H2264
SAF#	F03-006
Date Received	6-13-03
# Samples	1
Matrix	Soil
Volatiles	
Semivolatiles	X
Pest/PCB	
DRO/GRO/KRO	X
Herbicides	
GC Alcohol	X
Metals	X
Inorganics	X

The electronic data deliverable (EDD) will be emailed shortly. If you have any questions, please don't hesitate to contact me at (610) 280-3012.

Sincerely,

ionville Laboratory Incorporated

Orlette S. Jehnson Project Manager

Lionville Laboratory, Inc. BNA ANALYTICAL DATA PACKAGE FOR TNUHANFORD F03-006 H2264

DATE RECEIVED: 06/13/03 LVL LOT # :0306L625

CLIENT ID	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B161C2	001	s	03LE0733	06/11/03	06/17/03	06/30/03
B161C2	001 MS	S	03LE0733	06/11/03	06/17/03	06/30/03
B161C2	001 MSD	S	03LE0733	06/11/03	06/17/03	06/30/03
LAB QC:						
SBLKVU	MB1	s	03LE0733	N/A	06/17/03	06/27/03
SBLKVU	MB1 BS	S	03LE0733	N/A	06/17/03	06/27/03





Client: TNU-HANFORD F03-006

LVL#: 0306L625

SDG/SAF # H2264/F03-006

W.O. #: 11343-606-001-9999-00

Date Received: 06-13-2003

SEMIVOLATILE

One (1) soil sample was collected on 06-11-2003.

The sample and its associated QC samples were extracted according to Lionville Laboratory OPs based on method 3550 on 06-17-2003 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 06-27,30-2003.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- 1. All results presented in this report are derived from a sample that met LvLI's sample acceptance policy.
- 2. The sample was extracted and analyzed within required holding time.
- 3. Non-target compounds were detected in the sample.
- 4. All surrogate recoveries were within EPA QC limits.
- 5. All blank spike recoveries were within EPA QC limits.
- 6. All matrix spike recoveries were within EPA QC limits.
- 7. The method blank contained the common laboratory contaminants Bis (2-Ethylhexyl) phthalate and Din-butylphthalate at levels less than the CRQL.
- 8. Internal standard area and retention time criteria were met.
- 9. Manual integrations are performed according to OP 21-06A-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").
- 10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor

President

Lionville Laboratory Incorporated

som\gorup\data\bna\tnu-hanford-0306-625.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data.

Therefore, this report should only be reproduced in its entirety of 1 3 pages.

02

GLOSSARY

DATA QUALIFIERS

- U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 31.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- p = Identifies all compounds identified in an analysis at a secondary dilution factor.
- i = Interference.
- NQ = Result qualitatively confirmed but not able to quantify.
- A = Indicates that a TIC is a suspected aldol-condensation product.
- N = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TlCs), where the identification is based on a mass spectral library search. It is applied to all TlC results. For generic characterization of a TlC, such as chlorinated hydrocarbon, the N code is not used.
- X = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y = Additional qualifiers used as required are explained in the case narrative.



7

GLOSSARY

ABBREVIATIONS

BS	=	Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions
		and carried through all the steps in the method. Spike recoveries are reported.

BSD = Indicates blank spike duplicate.

MS = Indicates matrix spike.

MSD = Indicates matrix spike duplicate.

DL = Suffix added to sample number to indicate that results are from a diluted analysis.

NA = Not Applicable.

DF = Dilution Factor.

NR = Not Required.

SP, Z = Indicates Spiked Compound.



TECHNICAL FLAGS FOR MANUAL INTEGRATION

Manual quan modifications or integrations are performed routinely to improve the data quality for a variety of technical reasons. Documentation of these modifications should be clear and concise. The following "flags" are used to indicate the technical reasons for quan modifications:

- MP Missed Peak: manually added peak not found by automatic quan program.
- PA Peak Assignment: quan report was changed to reflect correct peak assignment.
- RI Routine Integration: routine integrations are performed for some analytes that are consistently integrated improperly by the automatic integration programs. Examples are the dichlorobenzene isomers on the VOA packed column and benzo(b)fluoranthene/benzo(k)fluoranthene which are poorly resolved on the BNA column.
- SP Split Peak: the automatic integration improperly split the peak; a manual integration was performed to get the correct area.
- CB Coelution/Background: peak was manually integrated to eliminate contribution from coeluting compounds, background signal, or other interference.
- PI Proper Integration: a peak with poor or inconsistent integration (e.g., excessive tail) was properly integrated manually.



Lionville Laboratory, Inc.

RFW Batch Number: 0306L625

*= Outside of EPA CLP QC limits.

Semivolatiles by GC/MS, Special List

Client: TNUHANFORD F03-006 H2264 Work Order: 11343606001

Report Date: 07/08/03 10:26

Page: 1a

RFW BACCII NUII	Der; 03001023_	<u>CITCHE.</u>	ATT CALL	MITORD TOS		********	<u> </u>	A Older. II	<u> </u>	1440	<u> + u</u>
	Cust ID:	B161C2	2	B161C2		B161C2		SBLKVU		SBLKVU BS	
Sample	RFW#:	00:	L	001 MS		001 MSD	ł	03LE0733-M	в1	03LE0733-MB1	
Information	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL	
	D.F.:	1.0		1.0		1.0		1.0		1.00	
	Units:	UG/I	KG	UG/K	G	UG/K	.G	UG/K	.G	UG/KG	
	Nitrobenzene-d5	57	*	67	*	67	૪	68	ક	63 %	
Surrogate	2-Fluorobiphenyl	55	ક	69	૪	71	8	70	8	68 %	
Recovery	Terphenyl-d14	77	ક	83	왐	84	ક	91	왐	85 %	
	Phenol-d5	54	윻	63	४	64	ક્ષ	64	¥	61 %	
	2-Fluorophenol	53	ક	63	왐	63	왐	62	*	58 %	
	2,4,6-Tribromophenol	55	¥	69	ક	68	왐	71	ક	72 %	
==========		=======	== f l = =		=fl=:	 =====	=f1	.##F===± ##	=f1		=====f1
Phenol		340	Ū	64	ક	64	ક	330	U	63 %	
bis(2-Chloroe	ethyl)ether	340	U	340	U	340	U	330	U	330 U	
2-Chloropheno	ol	340	U	60	8	61	ક	330	Ū	60 %	
1,3-Dichlorob	oenzene	340	U	340	U	340	U	330	U	330 U	
1,4-Dichlorob	oenzene	340	U	60	*	60	왕	330	U	60 %	
1,2-Dichlorob	oenzene	340	U	340	U	340	U	330	Ū	330 U	
2-Methylpheno	01	340	บ	340	U	340	U	330	U	330 U	
2,2'-oxybis(1	ol 1-Chloropropane)	340	U	340	U	340	U	330	U	330 U	
3- and/or 4-N	Methylphenol	340	U	340	Ū	340	Ū	330	U	330 Ŭ	
N-Nitroso-di-	-n-propylamine	340	U	65	ક	66	ક્ષ	330	U	64 %	
Hexachloroeth	hane	340	U	340	U	340	U	330	U	330 U	
			U	340	U	340	U	330	Ū	330 U	
Isophorone		340	U	340	U	340	U	330	U	330 Ŭ	
2-Nitrophenol	l	340	U	340	U	340	U	330	U	330 U	
2,4-Dimethyl	phenol	340	U	340	Ü	340	U	330	U	330 U	
bis(2-Chloro	ethoxy) methane	340	-	340	U	340	Ū	330	U	330 U	
2,4-Dichloron	phenol	340	U	340	U	340	U	330	U	330 U	
1,2,4-Trichle	orobenzene	340	U	58	४	59	왐	330	U	60 %	
Naphthalene_		340	U	340	U	340	U	330	U	330 U	
4-Chloroanil:	ine	340	U	340	Ū	340	U	330	U	330 U	
Hexachlorobut	tadiene	340	U	340	Ū	340	U	330	U	330 U	
4-Chloro-3-me	ethylphenol	340	U	65	8	67	웋	330	U	68 %	
2-Methylnaph	thalene	340	U	340	U	340	Ū	. 330	U	330 U	
	clopentadiene		U	340	U	340	U	330	U	330 U	
	orophenol		U	340	U	340	U	330	U	330 U	
2,4,5-Trichle	orophenol	850	U	850	U	850	Ŭ	840	U	840 U	

RFW Batch Number: 0306L625	Client: TNUHANFORD F03-006 H2264		Work Order: 11343606001			Page: 1b					
Cust ID:	B161C2		B161C2		B161C2		SBLKVU		SBLKVU BS		
RFW#:	001		001 MS		001 MSD		03LE0733-M	В1	03LE0733-M	B1	
2-Chloronaphthalene	340	U	340	U	340	U	330	U	330	U	
2-Nitroaniline	850	U	850	U	850	U	840	U	840	U	
Dimethylphthalate	340	U	340	Ü	340	U	330	U	330	U	
Acenaphthylene	340	U	340	U	340	U	330	U	330	ប	
Acenaphthylene2,6-Dinitrotoluene	340	U	340	U	340	U	330	U	330	U	
3-Nitroaniline	850	Ü	850	Ü	850	Ū	840	U	840	Ū	
Acenaphthene	340	U	68	ક	69	*	330	U	69	ક	
2,4-Dinitrophenol	850	Ū	850	Ū	850	U	840	U	840	Ŭ	
4-Nitrophenol		U	77	ક	77	ક	840	U	81	૪	
Dibenzofuran	340	U	340	U	340	U	330	U	330	Ŭ	
2,4-Dinitrotoluene		Ü	75	૪	74	緣	330	U	78	ફ	
Diethylphthalate	340	U	340	U	340	U	330	U	330	U	
Diethylphthalate4-Chlorophenyl-phenylether	340	U	340	U	340	U	330	Ŭ	330	U	
Fluorene	340	U	340	U	340	U	330	U	330	U	
Fluorene4-Nitroaniline4,6-Dinitro-2-methylphenol	850	U	850	U	850	U	840	U	840	U	
4.6-Dinitro-2-methylphenol	850	U	850	Ū	850	U	840	U	840	U	
N-Nitrosodiphenylamine (1)	340	Ū	340	U	340	U	330	· U	330	U	
4-Bromophenyl-phenylether		U	340	U	340	U	330	Ū	330	U	
Hexachlorobenzene		Ū	340	U	340	U	330	Ū	330	U	
Pentachlorophenol	850	U	70	8	69	왐	840	U	77	ક	
Phenanthrene		U	340	U	340	U	330	U	330	U	
Anthracene		U	340	U	340	Ū	330	U	330	U	
Carbazole		U	340	U	340	U	330	Ü	330	U	
Di-n-butylphthalate	28	JB	34	JB	31	JΒ	18	J	21	JB	
Fluoranthene		U	340	U	340	Ū	330	Ū	330	U ·	
Pyrene	340	U	72	8	73	ક્ષ	330	Ü	76	*	
PyreneButylbenzylphthalate	340	U	340	U	340	U	330	U	330	U	
3,3'-Dichlorobenzidine	340	U	340	U	340	U	330	U	330	U	
Benzo(a) anthracene		U	340	U	340	U	330	U	330	U	
Chrysene		U	340	U	340	U	330	U	330	U	
bis(2-Ethylhexyl)phthalate	340	U	340	Ū	64	JB	21	J	330	U	
Di-n-octyl phthalate	340	U	340	U	340	U	330	U	330	U	
Benzo(b) fluoranthene	340	U	340	U	340	U	330	U	330	U	
Benzo(k)fluoranthene	340	U	340	U	340		330		330		
Benzo(a)pyrene	340	U	340	U	340		330		330		
Indeno(1,2,3-cd)pyrene	340	U	340	U	340		330		330		
Dibenz(a,h)anthracene		U	340	U	340	U	330	U	330	U	
Benzo(g,h,i)perylene	340	U	340	U	340	U	330	U	330	U	
2-Butoxyethanol	340	Ū	340	U	340	U	330	U	330	U	
Benzyl alcohol	340	U	340	U	340	U	330	U	330	U	
*= Outside of EPA CLP QC limits.	=										

RFW Batch Number: 03	06L625	Client: TN	UHANFORD F03-006	H2264 Wor	k Order: 11343	606 001	Page: 1c
	Cust ID:	B161C2	B161C2	B161C2	SBLKVU	SBLKVU BS	
	RFW#:	001	001 MS	001 MSD	03LE0733-MB1	03LE0733-MB1	
Tributylphosphate		340 U	340 U	340 U	330 U	330 U	

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

1 F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT	SAMPLE	NO.	
1			
B161C2			

Lab Name: Lionville Labs, Inc. Work Order: 11343606001

Client: TNUHANFORD F03-006 H2264

Matrix: (soil/water) <u>SOIL</u> Lab Sample ID: <u>0306L625-001</u>

Sample wt/vol: 30.0 (g/mL) \underline{G} Lab File ID: $\underline{D063010}$

Level: (low/med) Low Date Received: 06/13/03

% Moisture: ____2 decanted: (Y/N)___ Date Extracted: 06/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/30/03

Injection Volume: 2.0(uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) <u>N</u> pH: $\underline{7.0}$ CONCENTRATION UNITS:

Number TICs found: $\underline{4}$ (ug/L or ug/Kg) $\underline{\text{UG/KG}}$

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
				====
1.	UNKNOWN	4.416	100	JB
2.	ALDOL CONDENSATE	4.791	100	JAB
3.	ALDOL CONDENSATE	5.324	10000	JAB
4. 79-34-5	1,1,2,2-TETRACHLOROETHANE	6.651	100	JBN
1	<u> </u>	l	l	

1F ORGANICS ANALYSIS DAT

CLIENT SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

1	
SBLKVU	
1	

Lab Name: Lionville Labs, Inc. Work Order: 11343606001

Client: TNUHANFORD F03-006 H2264

Matrix: (soil/water) SOIL Lab Sample ID: 03LE0733-MB1

Sample wt/vol: 30.0 (g/mL) \underline{G} Lab File ID: $\underline{D062711}$

Level: (low/med) LOW Date Received: 06/17/03

% Moisture: ____ decanted: (Y/N)__ Date Extracted: 06/17/03

Concentrated Extract Volume: 1000(uL) Date Analyzed: 06/27/03

Injection Volume: 2.0(uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0

Number TICs found: _5 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Ω
		======	========	=====
1. 79-00-5	1,1,2-TRICHLOROETHANE	3.961	70	JN
2.	UNKNOWN	4.433	200	J
3.	ALDOL CONDENSATE	4.808	100	JA
4.	ALDOL CONDENSATE	5.341	10000	JA
5. 79-34-5	1,1,2,2-TETRACHLOROETHANE	6.668	100	JN

Lionville	Laboratory	Use	Only

Custody Transfer Pagardii ah Mark Reguest no 1 4 1

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Est. Final Pro			· ·						##Tunn	Containes	Liquid															<u> </u>
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00 265C					34) day	<u>. </u>		Preserv	atives			050	1	<u>:</u>	7.5			INIC) DRG		1				
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MATRIX				•				trix							↓		Lionv	lle La	borate		e Ont	у	ţ			
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W - Water O - Oil	001	B1610	رغر				V		5	6-11-03	0925		11			1	ļ		بل	<u> </u>	ot					
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Liquids		 								[1	<u>.</u>						<u>.</u>	<u> </u>					
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F - Fish	 	1		<u></u>			 	1																		
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Special Instruc	lons:	SAF	# E0	2 - 00				DATE	REVISIO	NS:	·· ·					<u> </u>					Liony	lle Lab	oratory	Use O	nty	
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FH-Central Plat	eau Project	CI	HAIN OF CUST	ODY/S	AMPLI	ANAL	YSIS	REQUEST	r	F03-	-006-189	Page 1	of 1
Collector 6 6-11-3 Johansen/Pope/Pfister/Hug	hes	Compa	inv Contact Hulstrom	Telephot 373-3	ne No.			Project Coordi TRENT, SJ	nator	rice Code	8N	Data Tui	naround
Project Designation 200-PW-2/200-PW-4 OU -		Sampl	ing Location -B-12 (C3246); 197.5-20					SAF No. F03-006	A	ir Quality		45 1	Days
Ice Chest No.	c 01.037	Field I	Logbook No. F-N-3361		COA 117504ES	310		Method of Ship Federal Expre					
Shipped To Tros -4-	on Peura	Offsite	e Property No.	A030	286			Bill of Lading	Air Bill No	SE	E 05	PC	
POSSIBLE SAMPLE HAZ RADIOACTIVE TIE TO: BI	LARDS/REMARKS		Preservation	Cool 4C	Cool 4C	None	Cool	4C Cool 4C	None	None	None		
 Special Handling and/or	· Stornes		Type of Container		аG	aG	#G	aG	aG	aG	9		
	50014C	No. of Container(s)	1	1	i	1	1	1	1	3/1			
{	200170		Volume	60mL	125mL	60mL	125r	nL 60mL	60mL	60rnL	60mL	}	
	SAMPLE ANALY	YSIS	<u> </u>	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	See item Speci Instruct	ial 353.2; Oil &	See item (5) in Special Instructions	See item (6) in Special Attractions.	Tritium - H3		
Sample No.	Matrix *	Sample Date	Sample Time		44.6		3						
B161C2	SOIL	6-11-3	0925	×	X	X	×	×	<u> </u>	<u> </u>	ļ		
				<u> </u>	 		 -		 	 	 	 	}
	 				 	 			 	 	 -	 	
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Relinquished By/Removed From R-GA R- b- Relinquished By/Removed From F-GA R- b- LABORATORY Received SECTION	Date/Time 6/1/3 /4/7 Date/Time 14/7 Date/Time 14/7 Date/Time 14/7 Date/Time 12/2 6-12-03 Date/Time 12/2 Date/Time 12/2 Date/Time 12/2 13-03 09/0 i By	red in Rep 16 0 red In Part 1	sec 6:11. Refine 19 Refine 12 L:12 Ate/Time Ste/Time 3 091	417 03 (1) (2) TPH (3) (Soli (5) Gassage (4) (2) (2) (2) (2) (3) (4) (5) (5) (5) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6	pounds from Why the lab due to Alcohols, Glyco Semi-VOA - 82 - Diesel Range - ICP Metals - 60 Metals - 6010A Ourly - 7471 - (CIC Anions - 300) - 9045; Total Gamma Spectross Spectross Spectross Spectross Spectross Spectross	a detect IPH-D a b the radi ols, & Ke 70A (TC WTPH- 10A (Supertr V). 0 {Chlo Cyanide coopy (Con instruction)	ion limit of \$0.0 pCi nalysis. FH acknow characteristics. tones - 8015 (1-But L); Serni-VOA - 82 D; TPH-Gasoline R; pertrace) (Arsenic, I ace Add-On) (Antir vide, Fluoride, Nitra	/g for 14. Fledges that ho anol, Diethyl (70A (Add-Or 170A (Add-Or 170	ether, Ethylene ; 1) (2-Butoxyether) G ium, Chromium, Bismuth, Bo osphate, Sulfate 132, Europium 53, Thr 126); To	glycol, Methar anol, Tributyl , Lead, Selenii non, Copper, I }; Amuronia - . 154, Europius and Uranium. (CKA) - 123,	s) may not be not) phosphate}; nm, Silver}; Nickel}; 350.3; pH n=155}; Americian- Lotentrum 23=7 Date/Time	Matrix * S-Soil SE-Setimen SO-Solid SI-Studge W = Water O-Oil A-AAr DS-Drum Liquidy T-Tissee WI=Wipe L-Liquid V-Vegetnion X-Other	
FINAL SAMPLE Disposa DISPOSITION	i Method	_ _				Dispo	sed By					Date/Time	

LIONVILLE LABORATORY INCORPORATED SAMPLE RECEIPT CHECKLIST

ENT: TNU-HAN for A

hase Order/Project:

DATE: 6-13-03.

#/SOW#/Release#: F-03-006

oratory SDG #: 0306 L625

	Custody seals on coolers or shipping container intact, signed and dated?	,⊉Yes	D No	D N/A	☐ see Comment #
2.	Outside of coolers or shipping containers are free from damage?	☑ Yes	□ No	□ N/A	D see Comment #
3.	Airbill # recorded?	ET Yes	□ No	□ N/A	☐ see Comment #
١.	All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	D/Yes	D No	□ N/A	See Comment #
S.	Sample containers are intact?	D Yes	D N₀	D N/A	D see Comment #
5.	Custody seals on sample containers intact, signed and dated?	T2 Yes	D No	D N/A	D see Comment #
7.	All samples on coc received?	Ø Yes	□ No	□ N/A	· D see Comment #
В.	All sample label information matches coc?	₽ Yes	D No	□ N/A·	D see Comment #
9	Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	O√Yes	□ No	□ N/A	□ see Comment #
10.	Shipment meets LvLl Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	ET Yes	□ N ₀	DNA	☐ see Comment #
11.	Where applicable, bar code labels are affixed to coc?	D Yes	D No	BINIA	See Comment #
12.	coc signed and dated?	₽ Yes	D No	DNA	D see Comment is
13.	coc will be faxed or emailed to client?	Œ Yes∙	D N₀	DNA	D see Comment
14.	Project Manager/Client contacted concerning discrepancies? (name/date)	□ Yes	□ No	BNIA	D see Comment

Cooler	-#/	temp	(°C)	and	Comments:

ERC 01-037 1.5

Laboratory Sample Custodian

Laboratory Project Manager:

Cal Hug

Lionville Laboratory, Inc. DRO ANALYTICAL DATA PACKAGE FOR TNUHANFORD F03-006 H2264

DATE RECEIVED: 06/13/03 LVL LOT # :0306L625

CLIENT ID	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
		- —				
B161C2	001	S	03LE0732	06/11/03	06/17/03	07/11/03
B161C2	001 MS	S	03LE0732	06/11/03	06/17/03	07/11/03
B161C2	001 MSD	S	03LE0732	06/11/03	06/17/03	07/11/03
LAB QC:						
	MD1		027 70722	NT / 75	06/17/02	07/00/02
BLK	MB1	S	03LE0732	N/A	06/17/03	07/08/03
BLK	MB1 BS	S	03LE0732	A/N	06/17/03	07/08/03

Ab Nots





Analytical Report

W.O. #: 11343-606-001-9999-00

Date Received: 06-13-03

Client: TNU-HANFORD F03-006

LVL #: 0306L625

SDG/SAF #: H2264/F03-006

DIESEL RANGE ORGANICS

One (1) soil sample was collected on 06-11-03.

The sample and its associated QC samples were extracted on 06-17-03 and analyzed according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures on 07-08,11-03. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8015B. The analysis met the intent of method WTPH-D.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- 1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
- 2. All required holding times for extraction and analysis have been met.
- 3. The method blank was below the reporting limits for all target compounds.
- 4. All surrogate recoveries were within acceptance criteria.
- 5. The blank spike recovery was within acceptance criteria.
- 6. All matrix spike recoveries were within acceptance criteria.
- All initial calibrations associated with this data set were within acceptance criteria.
- 8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
- 9. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels //
Laboratory Manager

Lionville Laboratory Incorporated

pef\r:\group\data\dro\tnu hanford\06L-625.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 9 pages.



GLOSSARY OF DIESEL RANGE ORGANICS DATA

DATA QUALIFIERS

- U = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I = Interference.

ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- **DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA = Not Applicable.
- **DF** = Dilution Factor.
- NR = Not Required.
- SP = Indicates Spiked Compound.



GLOSSARY OF DIESEL RANGE ORGANICS DATA

- **D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C = This flag applies to a compound that has been confirmed by GC/MS.

Lionville Laboratory, Inc.

DIESEL RANGE ORGANICS BY GC

Client: TNUHANFORD F03-006 H2264 Work Order: 11343606001 Page: 1 RFW Batch Number: 0306L625 BLK BLK BS B161C2 Cust ID: B161C2 B161C2 03LE0732-MB1 03LE0732-MB1 001 MS 001 MSD Sample RFW#: 001 SOIL SOIL SOIL SOIL SOIL Information Matrix: 1.00 1.00 1.00 1.00 D.F.: 1.00 mg/Kg ma/Ka mg/Kg mg/Kg Units: mg/Kg 77 % 65 % 77 % 68 % p-Terphenyl 12.0 U 75 % 76 % 12.3 U 78 Diesel Range Organics 12.0 U 12.3 U 12.0 U 12.3 U 12.3 U Kerosene

Applied

Report Date: 07/11/03 15:06

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

1	ionville	Laboratory	Use	Only

Custody Transfer Record/Lab Work Request Page ____ of ____

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FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

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Client TNU	- HA	IN-forD	F03-0	06			Refrige	rator #	, -		2	1				_				٦_				
Est. Final Pro	. Samo	olino Date					#/Type	Container	Liquid		<u> </u>													
Project #		11343-60	6-001-9	999-00					Solid		146			AG			I A6		IAG	AG	*			
Project Conta	ct/Pho	ne #		<u></u>			Volume		Liquid									191						
Lionville Labo	ratory	Project Manage	r	OT					Solid	!	125			60			60	!	125	60				
oc 5ρες		Del 110	TAT	30 day	<u></u>		Preserv	atives	<u> </u>		OPG	ANIC		74		<u></u>	INC	200		1				
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W - Water O - Oil	001	3161C2			V	/	5	6-11-03	0925		11									1				
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FH-Central Pl	lateau Project		CHAIN OF CUST	ODY/S	AMPLE	EANALY	SIS	REQUEST	,	F03-	-006-189	Page i	of 1
Collector P 6-11-3 Johansen/Pope/Pfister/I	Hughes	Сол	noany Contact C Huistrom	Telephor 373-39	ne No.			Project Coordi TRENT, SJ	etor I	Price Code	8N	Data Tur	1
Project Designation 200-PW-2/200-PW-4 O	OU - Borehole Soil Sampling		noling Location 16-B-12 (C3246); 197.5-200	0				SAF No. F03-006		Air Quality		45 1	Days
Ice Chest No.	Rc 01.037		d Logbook No. INF-N-3361		COA 117504ES	10		Method of Shin Federal Expre					
Shipped To Trayle -		Off	site Property No.	A030	286			Bill of Lading	Air Bill N	° SE	E 05	PC	
POSSIBLE SAMPLE I											1 /		
RADIOACTIVE TIE TO:	: B171P5		Preservation	Cool 4C	Cool 4C	None	Cool		None	None	None		
Special Handling and	d/or Storage		Type of Container	aG l	aG	aG	a G		. sG 	aG L	4/1	-	
	C0014C		No. of Container(s)	60mL	125mL	60mL	125n		60mL	60mL	60mL		
	SAMPLE ANAL	rsis	Volume	See item (1) in Special Instructions.	Sec item (2) in Special Instructions.	See item (3) in Special Instructions.	See item Spec Instruct	iai 353.2; Oil &	See item (5) Special Instruction	Spepfal	Trikium - H3		
Sample No.	Matrix *	Sample Da	te Sample Time	Harks:			Š.				F. Sev		
B161C2	SOIL	6-11-3	0925	×	X	×	<u> </u>	×	/_				
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CHAIN OF POSSI	ESSION	Sign/P	rint Names		SPE	CIAL INSTRU	JCTI	ONS ion finit of \$0.0 pCi	QP	6-11-3	<u> </u>	<u> </u>	Matrix *
Relinquished By Removed Fr	Date/Time 200 Date/Time 4 7 Date/Time 4 7 Date/Time 7	Received By/	Stored In Da	sections 14/2 stections 3 09/1	417 commet (1) (2) (2) (2) (2) (3) (4) (5) (5) (6) (6) (6) (6) (6) (7) (7) (7) (7) (7) (7) (7) (7) (7) (7	pounds from WTI by the lab due to the Alcohols, Glycols Semi-VOA - 8270 -Diesel Range - V CP Metals - 6010 Metals - 6010A (cury - 7471 - (CV C Anions - 300.0) - 9045; Total C Camera Spectors and Spectors and Spectors and Spectors	PH-D a the radion of the radio	nalysis. FH acknow I characteristics. tones - 8015 (1-Butz L); Serni-VOA - 82 D; TPH-Gasoline Ri pertrace) (Arsenic, E race Add-On) (Antir uride, Fluoride, Nitra	inol, Diethy 70A (Add-C inge - WTP larium, Cad aony, Beryll e, Nitrite, P 50, Europiu 5, Radium	l ether, Ethylene ; l ether, Ethylene ; ln) {2-Butoxyeth H-G mium, Chromium ium, Bismuth, Bo hosphate, Sulfate m=132, Europium 128, Th=126+ T 2011-6-124, N	glycol, Methan anol, Tributyl ; t, Lead, Seleniu rron, Copper, N }; Ammonia - 1 }; Ammonia - 1 }; Ammonia - 1 II amium full V & 1	may not be ol) shosphate}; m, Silver}; lickel}; 350.3; pH =155}; Americians	S-Soil SE-Sodiment SO-Soild SI-Sludge W = Water O-Oil A-Air DS-Drum Solids DL-Drum Liquids T-Tisme WI-Wipe L-Liquid V-Vegetation X-Other
FINAL SAMPLE Disp DISPOSITION	posal Method						eu py				<u> </u>	Pater I Milit	

LIONVILLE LABORATORY INCORPORATED SAMPLE RECEIPT CHECKLIST

LIENT: TNU-HAN for A

rchase Order/Project:

DATE: 6-13-03.

/ SOW# / Release #: F03-006

aboratory SDG #: 0306 C625

2.	Custody seals on coolers or shipping container intact, signed and dated? Outside of coolers or shipping containers are	ØYes	. O No .	D N/A	☐ see Comment #
	Outside of coolers or shipping containers are				· .
	free from damage?	Id Yes .	D No	D N/A	D see Comment #
3.	Airbill # recorded?	ET Yes	□ No	□ N/A	□ see Comment #
	All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	D Yes	□ № 0	□ N/A	☐ see Comment #
5.	Sample containers are intact?	D'Yes	D No	□ N/A	D see Comment #
6.	Custody seals on sample containers intact, signed and dated?	D Yes	□ No	DN/A	☐ see Comment #
7.	All samples on coc received?	. ☑ Yes	□ No	D N/A	☐ see Comment #
8.	All sample label information matches coc?	Ø Yes	□ No	D N/A·	D see Comment #
9.	Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	D-Yes	□ No	□ N/A	☐ see Comment #
10.	Shipment meets LvLl Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	E Yes	□ No	O N/A	🗀 see Comment #
11.	Where applicable, bar code labels are affixed to coc?	D Yes	D No	BNA	See Comment #
12.	coc signed and dated?	E Ves	D No	AVIC	□ see Comment #
13.	coc will be faxed or emailed to client?	E Yes-	© №	DNA	D see Comment #
14.	Project Manager/Client contacted concerning discrepancies? (name/date)	° □Yes	D No	W N/A	See Comment #

Cooler # / temp (°C) and Comments:

ERG 01-037 1.5

Laboratory	Sample	Custodian:	

Cal Way

Laboratory Project Manager:

Lionville Laboratory, Inc. RO ANALYTICAL DATA PACKAGE FOR TNUHANFORD F03-006 H2264

DATE RECEIVED: 06/13/03 LVL LOT # :0306L625

CLIENT ID	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
						·
B161C2	001	s	03LVJ625	06/11/03	N/A	06/25/03
B161C2	001 MS	S	03LVJ625	06/11/03	N/A	06/25/03
B161C2	001 MSD	S	03LVJ625	06/11/03	N/A	06/25/03
LAB QC:						
				4 -	4-	
TBLKKO	MB1	S	03LVJ625	N/A	N/A	06/25/03
TBLKKO	MB1 BS	s	03LVJ625	N/A	N/A	06/25/03



760/1.180



Analytical Report

Client: TNU HANFORD F03-006

LVL#: 0306L625

SDG/SAF#: H2264/F03-006

W.O. #: 11343-606-001-9999-00

Date Received: 06-13-03

GASOLINE RANGE ORGANICS

One (1) soil sample was collected on 06-11-03.

The sample and its associated QC samples were prepped and analyzed according to Lionville Laboratory OPs based on SW846 method 8015B for Gasoline range organics (GRO) on 06-25-03. The analysis met the intent of method WTPH-G.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

- 1. All results presented in this report are derived from samples that met LVLI's sample acceptance policy.
- 2. All required holding times for analysis have been met.
- 3. The method blank was below the reporting limits for all target compounds.
- 4. One (1) of five (5) surrogate recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- 5. The blank spike recovery was within acceptance criteria.
- 6. All matrix spike recoveries were within acceptance criteria.
- 7. All initial calibrations associated with this data set were within acceptance criteria.
- 8. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

pef\Rrgroup\data\gro\tmu\\06L-625.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 9 pages.

Lionville Laboratory Sample Discrepancy Report (SDR) SDR #: 0346247 Batch: 03061625_____ Initiator: John Lack Parameter: 0'620. ___ Matrix: Samples: A R gs 7/11/03 Date: 50:1 Client: Method: SW846/MCAWW/CLP/ Prep Batch: 07 LVT 625 1. Reason for SDR _ Tech Profile Error __ Client Request __ Sampler Error on C-O-C __ Transcription Error __ Wrong Test Code __ Other ___ a. COC Discrepancy __ Tech Profile Error b. General Discrepancy __ Wrong Sample Pulled __ Label ID's Illegible __ Missing Sample/Extract __ Container Broken __ Insufficient Sample __ Preservation Wrong ___ Received Past Hold Hold Time Exceeded Insufficient Sample Not Amenable to Analysis Note*: Verified by [Log-In] or [Prep Group] (circle)...signature/date: __ c. Problem (Include all relevant specific results; attach data if necessary) Blank double spishrogeted. No scholate in Olack Spike. Juliles -2. Known or Probable Causes(s) 3. Discussion and Proposed Action Other Description: __ Re-log Narate. he sake in he Blank spike incontrol. Entire Batch Following Samples: matrix QC in control. Re-leach Re-extract Re-digest Revise EDD Change Test Code to Place On/Take Off Hold (circle) 4. Project Manager Instructions...signature/date: ✓ Concur with Proposed Action ___ Disagree with Proposed Action; See Instruction Include in Case Narrative Client Contacted: Date/Person _ Add Cancel Other Explanation: 5. Final Action...signature/date: ___ Verified re-[log][leach][extract][digest][analysis] (circle) __ Included in Case Narrative __ Hard Copy COC Revised _ Electronic COC Revised EDD Corrections Completed When Final Action has been recorded, forward original to QA Specialist for distribution and filing. $^{-1}$ Distribution of Completed SDR Route Distribution of Completed SDR Route __ Metals: Beegle X Initiator __ Inorganic: Perrone X Lab General Manager: M. Taylor __ GC/LC: Kiger X Project Mgr: Stone/Johnson/Haslett __ MS: Rychlak/Layman X Technical Mgr. Wesson/Daniels __ Log-in: Melnic X QA (file) __ Data Management: Feldman __ Admin: Soos Sample Prep: Beegle/Kiger __ Other:



GLOSSARY OF PESTICIDE/PCB DATA

DATA QUALIFIERS

- U = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I = Interference.
- .I = Indicates an interference on one analytical column only. Result is reported from remaining analytical column.

ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- DL = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA = Not Applicable.
- DF = Dilution Factor.
- NR = Not Required.



GLOSSARY OF PESTICIDE/PCB DATA

- This flag is used for an PESTICIDE/PCB target analyte when there is P greater than 25% difference for detected concentrations between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with a "P".
- This flag identifies all compounds identified in an analysis at a secondary D dilution factor.
- This flag applies to a compound that has been confirmed by GC/MS. C

GAS RANGE ORGANICS

Client: TNUHANFORD F03-006 H2264 Work Order: 11343606001 Page: 1 RFW Batch Number: 0306L625 Cust ID: B161C2 B161C2 B161C2 TBLKKO TBLKKO BS 03LVJ625-MB1 03LVJ625-MB1 001 001 MS 001 MSD Sample RFW#: Information SOIL SOIL SOIL SOIL Matrix: SOIL D.F.: 1.00 1.00 1.00 1.00 1.00 UG/KG UG/KG UG/KG UG/KG Units: UG/KG 0 * % Fluorobenzene 85 8 65 왐 82 왕 95 왐 Gasoline Range Organics (GRO) 74 % 30 U 29 U 99 % 111 %

persion la

Report Date: 07/11/03 12:08

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

L	ionville	Laboratory	Use	Only

Custody Transfer Record/Lab Work Request Page ___ of ____

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03066625

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

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Est. Final Pro	i. Samo	ling Date					#/Type	Container	Liquid				· ·											
Project #		11343-60	6.001-	9999-00			971 y pu		Solid	<u> </u>	AG			1A6			IA6		IAG	146				
1 .		ne #					Volume		Liquid															
Lionville Labo	ratory	Project Manage	r	OT					Solid	.	125			60			60		135	60			<u>:</u>	
OC SPEC		Del STD	_ TAT	30 de	<u>بل</u>		Preserv	atives		 				''				50	 					
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W - Water O - Oil	001	3161C2			1		S	6-11-03	0925		<u> </u>													
A - Air					7]]					_									i	
DS - Drum Solids					_]					
DL - Drum Liquids		 			1] .																
L - EP/TCLP Leachate	<u> </u>				+	 				 	 			 	-								-	
WI - Wipe X - Other	 				+	-		 	<u> </u>	\vdash	 	1						 		 				1
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MET O: RCRA + Sb. Be, Bi, B. Cu. Ni								1						Samples were: 1) Shipped or Hand Delivered Package or Airbill Solution or Chilled 2) Unbroken on OPackage or Package or 2) Ambient or Chilled 3) Present on Sar Condition or N 4) Unbroken on				Nuter r N Outer r N Sample or N						
1						<u></u>		6			===				===		4)	Sampl			S	ample (χ) ou	N
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FH-Central Platea	u Project		CI	IAIN OF CUST	ODY/S	AMPLE	EANALY	SIS	REQU	EST		_F03-	006-189	Page 1	of <u>1</u>
Collector (P 6-11-3 Johansen/Pope/Pfister/Hughes	3			nv Contact Iulstrom	Telephon 373-39				Project C TRENT, S	oordinato: J	Pr	ice Code	8N		rnaround
Project Designation 200-PW-2/200-PW-4 OU - Bo	orehole Soil Sampling			ng Location B-12 (C3246); 197.5-20	0				SAF No. F03-006	·	Ai	r Quality		45 1	Days
Ice Chest No.	01.037			ogbook No. -N-3361	COA 117504ES										
Shipped To TMTU-4-03 EBERLINE SERVICES (For		_	Offsite	Property No.	A030286				Bill of La	idin s /Alr I	Bill No.	SE	E 05	PC	
POSSIBLE SAMPLE HAZA	RDS/REMARKS		-										/		
RADIOACTIVE TIE TO: B171	P5			Preservation	Cool 4C	Cool 4C	None	Cool	4C Coc	il 4C	None	None	None		
Special Handling and/or S		Type of Container	a G	aG	aG	a G		G	åG ∵	aG	aG'				
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	00140		Volume	60mi.	125mL	60mL	1251	nL 60	mL t	50mL	60mL	/ 60mL			
		See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Sec item Spec Instruc	ial 353.2; tions. Grease Chro	Oi & S	tem (5) in pecial nuctions.	See item (1) in Special disputctions.	Tritium - H3					
Sample No.	Matrix *	Sample	e Date	Sample Time	i sa sa a	- 15 - 15 - 15 - 15 - 15 - 15 - 15 - 15		\$ 5 T		ateri M				A A	
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FGAGX 6-13		1 /	al	H-3-0	3 091 Tit	<u>ها (ه</u> ــــ	Febr-99, 5	rordi	on- 11 ,10	Tolar - 37	1:010	PIZ THOMOT	II The right in	232) Date/Time	6-11:3
LABORATORY Received B	у			ŭ	1 14								•		

Disposed By

Date/Time

Disposal Method

FINAL SAMPLE DISPOSITION

LIONVILLE LABORATORY INCORPORATED SAMPLE RECEIPT CHECKLIST

JENT: TNU-HAN SOR A

rchase Order/Project:

DATE: 6-13-03.

F# / SOW# / Release #: (-03-006

iboratory SDG #: 0306 L625

	ALL ENCEPTES MARKED HNOR MICE DE L	TO A SANTON SA	imin domini		·
	ALL ENTRIES MARKED "NO" MUST BE I				
1.	Custody seals on coolers or shipping container intact, signed and dated?	£ίΥes	□ No	□ N/A	☐ see Comment #
2.	Outside of coolers or shipping containers are free from damage?	₽Ýs	□ No	□ N/A	☐ see Comment#
3.	Airbill # recorded?	E Yes	□ No	D N/A	□ see Comment #
4.	All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	D Yes	□ No	□ N/A	□ see Comment #
5.	Sample containers are intact?	□Yes	□ No	D N/A	□ see Comment #
6.	Custody seals on sample containers intact, signed and dated?	D Yes	□ No.	□ N/A	□ see Comment #
7.	All samples on coc received?	. 12 Yes	□ No	□ N/A	· D see Comment #
8.	All sample label information matches coc?	Ø Yes	□ No	□ N/A·	D see Comment #
9.	Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	D/Yes	□ No	D N/A	D see Comment #
10.	Shipment meets LvLl Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	ETYes	□ No	D N/A	□ see Comment #
11.	Where applicable, bar code labels are affixed to coc?	□Yes	□ No	BINIA	□ see Comment #
12.	coc signed and dated?	E Yes	□ No	D N/A	see Comment #
13.	coc will be faxed or emailed to client?	TYes.	□ No	DWA	□ see Comment #
14.	Project Manager/Client contacted concerning discrepancies? (name/date)	□ Yes	□ No	E NVA	isee Comment #

Cooler # / temp (°C) and Comments:

ERC 01-037 1.5

Laboratory Sample Custodian:

Laboratory Project Manager:

Lionville Laboratory, Inc. GCSC ANALYTICAL DATA PACKAGE FOR TNUHANFORD F03-006 H2264

DATE RECEIVED: 06/13/03 LVL LOT # :0306L625

CLIENT ID	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B161C2	001	s	03LE0764	06/11/03	06/25/03	07/07/03
B161C2	001 MS	S	03LE0764	06/11/03	06/25/03	07/07/03
B161C2	001 MSD	S	03LE0764	06/11/03	06/25/03	07/07/03
LAB QC:						
·						
BLK	MB1	s	03LE0764	N/A	06/25/03	07/07/03
BLK	MB1 BS	S	03LE0764	N/A	06/25/03	07/07/03



Ap Irla



Analytical Report

Client: TNU HANFORD F03-006

LVL#: 0306L625

SDG/SAF#: H2264/F03-006

W.O.#: 11343-606-001-9999-00

Date Received: 06-13-03

GC SCAN

One (1) soil sample was collected on 06-11-03.

The sample and its associated QC samples were extracted and analyzed on 06-25-03 according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures. The extraction procedure was based on method 3580a (waste dilution – 1 g into 5 mLs) and the extracts were analyzed based on method 8015B for Methanol, Ethyl Ether, and 1-Butanol.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

- 1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
- 2. All required holding times for extraction and analysis have been met.
- 3. The method blank was below the reporting limits for all target compounds.
- 4. Surrogates are not currently employed in the methodology.
- 5. All blank spike recoveries were within acceptance criteria.
- 6. Two (2) of six (6) matrix spike recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- 7. All initial calibrations were within acceptance criteria.
- 8. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

r:\group\data\gcsc\06L-625b.doc

Date

4

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 9 pages.

Lionville Laboratory S	Sample Discrepancy Report	t (SDR) SDR #: 0366245
Initiator: John Lock. Date: 7/11/07 Client: Tow- Honders.	Batch: פאר איז	Parameter: OGCSC Matrix: SOUN Prep Batch: O3 LE 0764
1. Reason for SDR a. COC Discrepancy Tech Profe Transcript b. General Discrepancy Missing Sample/Extract C Hold Time Exceeded In Improper Bottle Type N Note: Verified by [Log-In] or [Prep Group] (circ. Problem (Include all relevant specents) C. Problem (Include all relevant specents) Con T 20 20 20 20 20 20 20 20 20 20 20 20 20	nsufficient Sample Preserva Not Amenable to Analysis ircle)signature/date: cific results; attach data if necessary) ETY ETY.	Sampler Error on C-O-C Other Cample Pulled Label ID's Illegible ation Wrong Received Past Hold
3. Discussion and Proposed Action Re-log Entire Batch Following Samples: Re-leach Re-extract Re-digest Revise EDD Change Test Code to Place On/Take Off Hold (circle) 4. Project Manager Instructionssign Concur with Proposed Action Disagree with Proposed Action; Solucide in Case Narrative Client Contacted: Date/Person Add Cancel	Numere. Blank S No hits in SAMP nature/date:	Spike in control. ples 7½ reporting Linet (10)
Verified re-[log][leach][extract][digo Included in Case Narrative Hard Copy COC Revised Electronic COC Revised EDD Corrections Completed	Other Explainest][analysis] (circle) ed, forward original to QA Specialist fo	
Route Distribution of Completed SDR X Initiator X Lab General Manager: M. T X Project Mgr: Stone/Johnson X Technical Mgr: Wesson/Dan X QA (file) Data Management: Feldman Sample Prep: Beegle/Kiger	R Route Distribut	ition of <u>Completed</u> SDR als: Beegle ganic: Perrone LC: Kiger Rychlak/Layman in: Melnic in: Soos



GLOSSARY OF PESTICIDE/PCB DATA

DATA QUALIFIERS

- U = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I = Interference.
- .I = Indicates an interference on one analytical column only. Result is reported from remaining analytical column.

ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- DL = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA = Not Applicable.
- DF = Dilution Factor.
- NR = Not Required.



GLOSSARY OF PESTICIDE/PCB DATA

- This flag is used for an PESTICIDE/PCB target analyte when there is greater than 25% difference for detected concentrations between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with a "P".
- This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- This flag applies to a compound that has been confirmed by GC/MS.

GC SCAN

Report Date: 07/11/03 11:45 RFW Batch Number: 0306L625 Client: TNUHANFORD F03-006 H2264 Work Order: 11343606001 Page: 1

	Cust ID:	B161C2	B161C2	B161C2	BLK	BLK BS	
Sample RFW#:		001	001 MS	001 MSD	03LE0764-MB1	03LE0764-MB1	
Information	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	
	D.F.:	1.00	1.00	1.00	1.00	1.00	
	Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
	2222222	=====fl==	======f1=:	-======f]	 l======f1	f1	
Methanol		24 U	96 %	94 %	25 U	102 %	
Ethyl Ether		24 U	30 * %	26 * %	25 U	50 %	
1-Butanol		24 U	98 %	95 %	25 U	98 %	

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Laboratory	

Custody Transfer Record/Lab Work Request Page ___of____

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FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

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Est. Final Proj	l. Samo	ling Date				#/Tune	Container	Liquid														ļ —	
Project #		11343-606.001.	999-00					Solid		146			IAG			A6		JAG-	IAG				
1 .		ne#]	Volume		Liquid		. :						,				 		<u>- </u>	
Lionville Labo	oratory	Project Manager						Solid		125			60			60		125	60				
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MATRIX CODES: Matrix									1 -		+		Lionvi	ile La	oorato	ory Us	(9)						
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METO: RCRA+36. Pe, DI, D. C. NI							1. Samples 1) Shippe Hand Deli 3. 2. 2) Ambler 3) Receive 5. Condition						Lionville Laboratory Use Only Imples were: Shipped or 1) Present of the state of th			ken on Siken on	Outer N Emple or N						
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FEDGY (0) 16 1 6-13-03 10910 CO.						POSITE RE		REW	111	EN	\vdash	Samples Labels and COC Record? Y or N NOTES:			_	H	olding '				ooler emp	15	_ °C

FH-Central	Plateau Project		CH	IAIN OF CUST	ODY/S	<u>ampl</u> i	E ANALY	SIS	REQUEST		F03-	-006-189	Page 1 of 1	
Collector 6-11-3 Johanson/Pope/Pfist	er/Hughes		Compa	ny Contact ulstrom	Telephon 373-39	e No.			Project Coordi TRENT, SJ	netor	Price Code 8N		Data Turnaround	
Project Designation 200-PW-2/200-PW-	4 OU - Borehole Soil Sampling			ng Location B-12 (C3246); 197.5-20	0	<u>-</u>			SAF No. F03-006		Air Quality 🗌		45 1	Days
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RADIOACTIVE TIE				Preservation	Cool 4C	Cool 4C	None	Cool	IC Cool 4C	None	None	None		
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	C0014C		L	No. of Container(s)	1	1	'	1	1	1		3/1		
					60mL	125mL	60mL	125π	ıL 60mL	60mL	60mL)	/ 60mL		
SAMPLE ANALYSIS					See item (1) in Special Instructions.	See item (2) is Special Instructions.	Special	See item (Special Instruction	ai 353.2; Oil &	See item (5) Special Instructions	Spepfal	Tritium - H3	:	
Sample No.	Matrix *	Sampl	le Date	Sample Time	14 m	-34 / 19			N _G Yan Maja		S SEE SEENE	16.758	Street Contraction	
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CHAIN OF PO	SSESSION	Sic	gn/Print	Names	<u> </u>	CPE	CIAL INSTR	UCTIC	INS		h11-3		L	Matrix *
Relinquished By/Removed From Date/Time Received By/Stored In Pate/Time Date/Time Received By/Stored In Date/Time Received By/Stored In Date/Time Pate/Time P				din Rahlbaradin Da	te/Time	7 (1) commet met (2) (2) (2) (2) (3) (CP Mer (4) (Soil (5)- Gam (24)- (6) (Gam (2	pounds from WI by the lab due to Alcohols, Glycol Semi-VOA - 827 I-Diesel Range - ICP Metals - 601 Metals - 6010A reury - 7471 - (C' IC Anions - 300. it) - 9045; Total C Gastern Specter Add - 15000000000000000000000000000000000000	PH-D ar the radl is, & Ket IOA (TCI WTPH-I IOA (Supertra V) 0 {Chlor Cyanide - IOA (Supertra V) 0 {Chlor Cyanide - IOA (Supertra V)	on limit of 50.0 pGi alysis. FH acknow, characteristics. ones - 8015 {1-Buts); Semi-VOA 82 D; TPH-Gasoline Ra ettrace) {Arsenic, E nce Add-On) {Antin ide, Fluoride, Nitrat	edges that h nol, Diethyl 70A (Add-C nge - WTPI arium, Cadi nony, Berylli e, Nitrite, Pl 6, Ramunt 200-141-14	l ether, Ethylene policy (les lether, Ethylene policy ether) (les les les les les les les les les les	s than 14 days) glycol, Methano anol, Tributyl pl , Lead, Seleniur ron, Copper, Ni ; Ammonia - 3: 154, Europium tal Uranium A	nay not be oil hosphate}; m, Silver}; ickel}; 50.3; pH 155}; medicium kplontury	S-Soil SE-Soliment SO-Solid SI-Sledge W = Water O-Oil A-Air DS-Dram Liquids T-Tissue Wi-Wipe L-Liquid V-Vegetation X-Other
SECTION	·								<u></u>					
FINAL SAMPLE 1	Disposal Method			٠			Dispo	sed By				D	Date/Time	



LIONVILLE LABORATORY INCORPORATED SAMPLE RECEIPT CHECKLIST

LIENT: TNU-HAN for A

urchase Order/Project:

DATE: 6-13-03.

AF# / SOW# / Release #: F03-006

aboratory SDG #: 0306 L625

OTE:	ALL ENTRIES MARKED "NO" MUST BE E	EXPLAINED IF	THE COMM	ENT SECTION	
1.	Custody seals on coolers or shipping container intact, signed and dated?	ØYes	. D No .	O N/A	see Comment #
2.	Outside of coolers or shipping containers are free from damage?	₽ Yes	D No	D N/A	see Comment #
3.	Airbill # recorded?	Ð Ýes	□ No	D N/A	□ see Comment #
4.	All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	O Yes	□ No	□ N/A	☐ see Comment #
5.	Sample containers are intact?	□ Yes	□ N ₀	□ N/A	□ see Comment #
6.	Custody seals on sample containers intact, signed and dated?	ØYes □	□ No	□ N/A	D see Comment #
7.	All samples on coc received?	D Yes	□ No	□ N/A	see Comment #
8.	All sample label information matches coc?	D Yes	D No	□ N/A·	See Comment #
9.	Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	D/Yes	□ N ₀	DWA	□ see Comment #
10.	Shipment meets LvLI Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	EYes ·	□ No	DNA	□ see Comment #
11.	Where applicable, bar code labels are affixed to coc?	□ Yes	□ No	BNA	🗅 see Comment #
12.	coc signed and dated?	□ Yes	□ No	AMO	Sec Comment #
13.	coc will be faxed or emailed to client?	Yes.	□ No	D N/A	□ see Comment #
14.	Project Manager/Client contacted concerning discrepancies? (name/date)	□ Yes	□ No	MIA	□ see Comment #

Cooler # /	temp	(°C) and	Comments:
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ERC 01-037 1.5

Laboratory Sample Custodian:

Cal Wil

Laboratory Project Manager:

Lionville Laboratory, Inc. 8015 ANALYTICAL DATA PACKAGE FOR TNUHANFORD F03-006 H2264

DATE RECEIVED: 06/13/03

LVL LOT # :0306L625

CLIENT ID	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
						
B161C2	001	S	03LE0763	06/11/03	06/25/03	06/25/03
B161C2	001 MS	s	03LE0763	06/11/03	06/25/03	06/25/03
B161C2	001 MSD	S	03LE0763	06/11/03	06/25/03	06/25/03
LAB QC:						
BLK	MB1	s	03LE0763	N/A	06/25/03	06/25/03
BLK	MB1 BS	S	03LE0763	N/A	06/25/03	06/25/03



Applals



Analytical Report

Client: TNU HANFORD F03-006

LVL#: 0306L625

SDG/SAF#: H2264/F03-006

W.O.#: 11343-606-001-9999-00

Date Received: 06-13-03

GC SCAN-Ethylene Glycol

The set of samples consisted of two (2) soil samples collected on 6-11-03.

The samples and their associated QC samples were prepped and analyzed on 06-25-03 03 according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures. The extraction procedure was based on method 3580A (waste dilution -1 g into 5 mL water) and the extracts were analyzed based on method 8015B for Ethylene Glycol.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

- 1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
- 2. All required holding times for extraction and analysis have been met.
- 3. The method blank was below the reporting limits for all target compounds.
- 4. Surrogates are not currently employed in the methodology.
- 5. The blank spike recovery was within acceptance criteria.
- 6. All matrix spike recoveries were within acceptance criteria.
- 7. All initial calibrations were within acceptance criteria.
- 8. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

r:\group\data\gcsc\06L-625a.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 8 pages.



GLOSSARY OF PESTICIDE/PCB DATA

DATA QUALIFIERS

- U = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I = Interference.
- Indicates an interference on one analytical column only. Result is reported from remaining analytical column.

ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- DL = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA = Not Applicable.
- **DF** = Dilution Factor.
- NR = Not Required.



GLOSSARY OF PESTICIDE/PCB DATA

- This flag is used for an PESTICIDE/PCB target analyte when there is greater than 25% difference for detected concentrations between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with a "P".
- This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C = This flag applies to a compound that has been confirmed by GC/MS.

Nonhalogenated Volatiles by GC, Method 8015

Report Date: 07/11/03 11:41 RFW Batch Number: 0306L625 Client: TNUHANFORD F03-006 H2264 Work Order: 11343606001 Page: 1 Cust ID: B161C2 B161C2 B161C2 BLK BLK BS Sample RFW#: 001 001 MS 03LE0763-MB1 03LE0763-MB1 001 MSD Information Matrix: SOIL SOIL SOIL SOIL SOIL D.F.: 1.00 1.00 1.00 1.00 1.00 Units: uq/Kq ug/Kg ug/Kg ug/Kg ug/Kg Ethylene Glycol 22.5 U 107 ÷ 96 % 25.0 U 83 %

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Laboratory	Use	Only
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Custody Transfer Record/Lab Work Request Page 1 of 1

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DL - Drum Liquids								1			1						1					[]		
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by by by					СЗП	2	-UKIL	HN	4	\dashv			abels ar rd? Y		5) Received Within (Y) or N									
FEDEX (6-13-03 0410 CO					WA	SIE	<u>.</u>	REW	H.	IEN			TES:	/	ر مرم	1440	will		or N		emp	1.5	_ ° C	

FH-Central Plat	eau Project	Cı	HAIN OF CUST	ODY/S	AMPLE	ANAL	YSIS	REQUEST	<u> </u>	F03-	-006-189	Page 1	of <u>1</u>
Collector 6 6-11-3 Johanson/Pope/Pfister/Hug	ihes		env Contact Huistrom	Telepho 373-3				Project Coordi TRENT, SJ	nator	Price Code	8N	Data Tur	naround
Project Designation 200-PW-2/200-PW-4 OU	- Borehole Soil Sampling		ling Location -B-12 (C3246); 197.5-20	0				SAF No. F03-006	1	Air Quality		45 I	Days -
Ice Chest No.	c 01.037		Logbook No. F-N-3361	COA Method of Shipment 117504ES10 Federal Express									
	03 PHAY PREUTA	Offsite	e Property No.	A030	286			Bill of Lading/	Air Bill N	. SE	E OF	PC	
POSSIBLE SAMPLE HAZ	ZARDS/REMARKS					Ĭ		f .	ł	1	/		
RADIOACTIVE TIE TO: B.	RADIOACTIVE TIE TO: B171P5			Cool 4C	Cool 4C	None	Cool	4C Cool 4C	None	None	None		
 Special Handling and/or	!	Type of Container	aG	aG	aG	a.G		aG ·	aG	*6'			
			No. of Container(s)	1	1	1	1] 1	1	J 1.	3/1		
C0014C			Volume	60mL	i 25mL	60mL	125n	nL 60mL	60mL	60mL)	60mL		
	SAMPLE ANALYSI	s	,	See item (1) in Special Instructions.	See item (2) in Special Instructions	See item (3) in Special Instructions.	See item Speci Instruct	al 353.2; Oil &	See item (5) Special Instruction	in See item () in Special Supportions.	Tritium - H3		
Sample No.	Matrix *	Sample Date	Sample Time	. We see	e de la constante de la consta						Copies i	建	A CONTRACTOR
B161C2	SOIL (6-11-3	0925	メ	X	×	X	<u> </u>	<u> </u>				
				<u> </u>	<u> </u>					_			<u> </u>
		<u> </u>		<u> </u>							<u> </u>		 _
				<u> </u>	<u> </u>				<u> </u>	_		<u> </u>	
					<u> </u>	<u> </u>					<u> </u>	L	
Relinquished By/Removed From Relinquished By/Removed From FGO(5) & 6- LABORATORY Receive SECTION	Date/Time 6/11/3 1417 Date/Time 1417 Date/Time 1417 A11 - 0-3 Date/Time 1200 6-12-03 Date/Time 1200 Dat	Sign/Prin Received By/Stor K + OS Received By/Stor B 3/2 Received By/Stor TZ + CO 1 Received By/Stor TZ + CO 1 Received By/Stor C O 1	red in Roy 160 Post 1	ate/Time 14 L·/2 ate/Time 3 09	417 03 (1) 4 (2) 5 17 (3) 1 (3) 1 (5) 4 (6) 1 (6) 4 (7) 4 (8) 1 (9) 4 (9) 4 (9) 4 (9) 4 (9) 4 (9) 4 (9) 4 (9) 4 (9) 6 (9) counds from Who by the lab due to Alcohols, Glyco Semi-VOA - 82 Diesel Range - (CP Metals - 60 Metals - 6010A cury - 7471 - (Cf Anions - 300) - 9045; Total (Canama Spectra and Isstepis Anions - 4dd Isstepis Anions - 7471 - (Cf Anions - 200) - 9045; Total (Canama Spectra anions - 200) - 9045; Total (Canama Spectra anions - 200)	IPH-D a the radi ls, & Ke 70A (TC WTPH- 10A (Supertr V) 0 (Chlo Cyanide coopy (C con (Coo	ion limit of \$0.0 pCi nalysis. FH acknow characteristics. tones - 8015 {1-But L); Semi-VOA 82 D; TPH-Gasoline Ra pertrace) (Arsenic, E ace Add-On) (Antin ride, Fluoride, Nitrat	anol, Diethy 70A (Add-C ange - WTP Barium, Cad mony, Beryll e, Nitrite, P 66, Europiu 6, Radium	the character of the ch	s than 14 days glycol, Methan anol, Tributyl p , Lead, Seleniu ron, Copper, N); Ammonia - 3 154, Europium tal Uranium: A	ol} onay not be ol} ohosphate}; on, Silver}; lickel}; ls0.3; pH	Matrix * S-Soil SE-Sodiment SO-Soid Sil-Shadge W = Water O-Oil A-Air DS-Drum Solids DL-Drum Liquids T-Tiame W!=Wipe L*-Liquid V=Vogetation X=Other	
FINAL SAMPLE Dispose DISPOSITION	al Method					ınspo	er by					/e(E) į UIE	

LIONVILLE LABORATORY INCORPORATED SAMPLE RECEIPT CHECKLIST

:LIENT: TNU-HAN SOR A

urchase Order/Project:

DATE: 6-13-03.

AF# / SOW# / Release #: [-03-006

_aboratory SDG #: 0306 L625

OTE:	ALL ENTRIES MARKED "NO" MUST BE F		THE COMM	ENT SECTION	
1.	Custody seals on coolers or shipping container intact, signed and dated?	ØYes	_ D №	D N/A	see Comment #
2.	Outside of coolers or shipping containers are free from damage?	D Yes	D No	D N/A	D see Comment#
3.	Airbill # recorded?	E Yes	□ No	□ N/A	see Comment #
4.	All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	D∕Yes	□ No	DN/A	☐ sec Comment #
5.	Sample containers are intact?	□ Yes	D №	D N/A	see Comment #
6.	Custody seals on sample containers intact, signed and dated?	D Yes	□ No	□ N/A	□ see Comment #
7.	All samples on coc received?	☑ Yes	□ No	□ N/A	□ see Comment #
8.	All sample label information matches coc?	Ø Yes	DNo	D N/A·	see Comment #
9.	Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	D∕Ýes	□ No	DNA	□ see Comment #
10.	Shipment meets LvLl Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	E Yes	□ No	D N/A	□ see Comment #
11	Where applicable, bar code labels are affixed to coc?	D Yes	□ No	BNA	□ see Comment #
12	. coc signed and dated?	& Yes	□N ₀	□ N/A	D see Comment #
13	. coc will be faxed or emailed to client?	E Yes	□ No	D N/A	See Comment is
14	. Project Manager/Client contacted concerning discrepancies? (name/date)	□ Yes	□ No	MINA	D see Comment #

Cooler # / temp (°C) and Comments:

ERG 01-037 1.5

Laboratory Sample Custodian:

Cal Why

Laboratory Project Manager:



Lionville Laboratory, Inc. INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD F03-006 H2264

DATE RECEIVED: 06/13/03 LVL LOT # :0306L625

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B161C2						
SILVER, TOTAL	001	s	03L0359	06/11/03	06/27/03	07/03/03
SILVER, TOTAL	001 REP	S	03L0359	06/11/03	06/27/03	07/03/03
SILVER, TOTAL	001 MS	S	03L0359	06/11/03	06/27/03	07/03/03
ARSENIC, TOTAL	001	S	03L0359	06/11/03	06/27/03	07/03/03
ARSENIC, TOTAL	001 REP	s	03L0359	06/11/03	06/27/03	07/03/03
ARSENIC, TOTAL	001 MS	S	03L0359	06/11/03	06/27/03	07/03/03
BORON, TOTAL	001	s	03L0359	06/11/03	06/27/03	07/03/03
BORON, TOTAL	001 REP	s	03L0359	06/11/03	06/27/03	07/03/03
BORON, TOTAL	001 MS	s	03L0359	06/11/03	06/27/03	07/03/03
BARIUM, TOTAL	001	S	03L0359	06/11/03	06/27/03	07/03/03
BARIUM, TOTAL	001 REP	s	03L0359	06/11/03	06/27/03	07/03/03
BARIUM, TOTAL	001 MS	S	03L0359	06/11/03	06/27/03	07/03/03
BERYLLIUM, TOTAL	001	S	03L0359	06/11/03	06/27/03	07/03/03
BERYLLIUM, TOTAL	001 REP	S	03L0359	06/11/03	06/27/03	07/03/03
BERYLLIUM, TOTAL	001 MS	s	03L0359	06/11/03	06/27/03	07/03/03
BISMUTH, TOTAL	001	S	03L0359	06/11/03	06/27/03	07/03/03
BISMUTH, TOTAL REP	001 REP	S	03L0359	06/11/03	06/27/03	07/03/03
BISMUTH, TOTAL SPIKE	001 MS	s	03L0359	06/11/03	06/27/03	07/03/03
CADMIUM, TOTAL	001	s	03L0359	06/11/03	06/27/03	07/03/03
CADMIUM, TOTAL	001 REP	S	03L0359	06/11/03	06/27/03	07/03/03
CADMIUM, TOTAL	001 MS	s	03L0359	06/11/03	06/27/03	07/03/03
CHROMIUM, TOTAL	001	S	03L0359	06/11/03	06/27/03	07/03/03
CHROMIUM, TOTAL	001 REP	S	03L0359	06/11/03	06/27/03	07/03/03
CHROMIUM, TOTAL	001 MS	s	03L0359	06/11/03	06/27/03	07/03/03
COPPER, TOTAL	001	S	03L0359	06/11/03	06/27/03	07/03/03
COPPER, TOTAL	001 REP	S	03L0359	06/11/03	06/27/03	07/03/03
COPPER, TOTAL	001 MS	s	03L0359	06/11/03	06/27/03	07/03/03
MERCURY, TOTAL	001	s	03C0150	06/11/03	06/19/03	06/20/03
MERCURY, TOTAL	001 REP	S	03C0150	06/11/03	06/19/03	06/20/03
MERCURY, TOTAL	001 MS	s	03C0150	06/11/03	06/19/03	06/20/03
NICKEL, TOTAL	001	S	03L0359	06/11/03	06/27/03	07/03/03
NICKEL, TOTAL	001 REP	S	03L0359	06/11/03	06/27/03	07/03/03
NICKEL, TOTAL	001 MS	s	03L0359	06/11/03	06/27/03	07/03/03
LEAD, TOTAL	001	s	03L0359	06/11/03	06/27/03	07/03/03
LEAD, TOTAL	001 REP	S	03L0359	06/11/03	06/27/03	07/03/03

Lionville Laboratory, Inc. INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD F03-006 H2264

DATE RECEIVED: 06/13/03

LVL LOT # :0306L625

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
	001 110		027.0250	05/11/02	06/27/02	07/02/02
LEAD, TOTAL	001 MS	S	03L0359	06/11/03	06/27/03	07/03/03
ANTIMONY, TOTAL	001	S	03L0359	06/11/03	06/27/03	07/03/03
ANTIMONY, TOTAL	001 REP	S	03L0359	06/11/03	06/27/03	07/03/03
ANTIMONY, TOTAL	001 MS	S	03L0359	06/11/03	06/27/03	07/03/03
SELENIUM, TOTAL	001	S	03L0359	06/11/03	06/27/03	07/03/03
SELENIUM, TOTAL	001 REP	S	03L0359	06/11/03	06/27/03	07/03/03
SELENIUM, TOTAL	001 MS	S	03L0359	06/11/03	06/27/03	07/03/03

LAB QC:

SILVER LABORATORY	LC1	BS	s	03L0359	N/A	06/27/03	07/01/03
SILVER, TOTAL	MB1		S	03L0359	N/A	06/27/03	07/01/03
ARSENIC LABORATORY	LC1	BS	s	03L0359	N/A	06/27/03	07/01/03
ARSENIC, TOTAL	MB1		S	03L0359	N/A	06/27/03	07/01/03
BORON LABORATORY	LC1	BS	S	03L0359	N/A	06/27/03	07/01/03
BORON, TOTAL	MB1		S	03L0359	N/A		07/01/03
BARIUM LABORATORY	LC1	BS	S	03L0359	N/A	06/27/03	07/01/03
BARIUM, TOTAL	MB1		S	03L0359	N/A	06/27/03	07/01/03
BERYLLIUM LABORATORY	LC1	BS	S	03L0359	N/A	06/27/03	07/01/03
BERYLLIUM, TOTAL	MB1		S	03L0359	N/A	06/27/03	07/01/03
BISMUTH, LCS	LC1	BS	S	03L0359	N/A	06/27/03	07/01/03
BISMUTH, TOTAL	MB1		S	03L0359	N/A	06/27/03	07/01/03
CADMIUM LABORATORY	LC1	BS	S	03L0359	N/A	06/27/03	07/01/03
CADMIUM, TOTAL	MB1		S	03L0359	N/A	06/27/03	07/01/03
CHROMIUM LABORATORY	LC1	BS	S	03L0359	N/A	06/27/03	07/01/03
CHROMIUM, TOTAL	MB1		S	03L0359	N/A	06/27/03	07/01/03
COPPER LABORATORY	LC1	BS	S	03L0359	N/A	06/27/03	07/01/03
COPPER, TOTAL	MB1		S	03L0359	N/A	06/27/03	07/01/03
MERCURY LABORATORY	LC1	BS	S	03C0150	N/A	06/19/03	06/20/03
MERCURY, TOTAL	MB1		S	03C0150	N/A	06/19/03	06/20/03
NICKEL LABORATORY	LC1	BS	S	03L0359	N/A	06/27/03	07/01/03
NICKEL, TOTAL	MB1		S	03L0359	N/A	06/27/03	07/01/03
LEAD LABORATORY	LC1	BS	S	03L0359	N/A	06/27/03	07/01/03
LEAD, TOTAL	MB1		S	03L0359	N/A	06/27/03	07/01/03
ANTIMONY LABORATORY	LC1	BS	S	03L0359	N/A	06/27/03	07/01/03
ANTIMONY, TOTAL	MB1		S	03L0359	N/A	06/27/03	07/01/03
SELENIUM LABORATORY	LC1	BS	S	03L0359	N/A	06/27/03	07/01/03
SELENIUM, TOTAL	MB1		S	03L0359	N/A	06/27/03	07/01/03



Analytical Report

Client: TNU-HANFORD F03-006

LVL#: 0306L625

SDG/SAF#: H2264/F03-006

W.O.#: 11343-606-001-9999-00

Date Received: 06-13-03

METALS CASE NARRATIVE

1. This narrative covers the analyses of 1 soil sample.

- 2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.
- 3. All analyses were performed within the required holding times.
- 4. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
- 5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).
- 6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).
- 7. The preparation/method blank for 1 analyte was outside method criteria. {less than the Practical Quantitation Limit (3X the IDL), or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.
 - a). The MB result for Beryllium was greater than the Practical Quantitation Limit (PQL) {3 x the (IDL) Instrument Detection Level} and all samples read less than 20 times the MB concentration. However, no corrective action criteria for MBs were provided in SW846 method 6010B. The sample results were reported herein "uncorrected" for the levels found in the MB.
- 8. All ICP Interference Check Standards were within control limits.
- 9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to the Inorganics Laboratory Control Standards Report.
- 10. The matrix spike (MS) recovery for 1 analyte was outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of pages.

11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at meaningful concentration level for the following analytes:

		<u>PDS</u>	PDS
Sample ID	Element	Concentration (ppb)	% Recovery
B161C2	Antimony	100	106.1

- 12. The duplicate analyses for 3 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.
- 13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.
- 14. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

jjw/m06-625

<u>0</u> 1-11-03 Date



METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this Lot#: (3066615 Leaching Procedure: __1310 __1311 __1312 __Other:_____ CLP Metals __ Digestion and __ Analysis Methods: __ILM03.0 __ILM04.0 Metals Digestion Methods: __3005A __3010A __3015 __3020A \(\sum_3050B \) __3051 __200.7 __SS17 Other: Metals Analysis Methods **EPA** USATHAMA **OSWR** STD MTD **EPA** SW846 99 200.7 6010B Aluminum 99 204.2 200.7 7041 5 ₹ 6010B Antimony 99 200.7 206.2 3113B 7060A 5 **∠6010B** Arsenic 99 200.7 **7**6010**B** Barium 99 % 6010B 200.7 Beryllium 99 1620 200.7 **×6010B¹** Bismuth 99 200.7 **★6010B** Boron 99 213.2 200.7 **7**6010**B** 7131A ⁵ Cadmium 99 200.7 6010B Calcium **SS17** 200.7 218.2 **6010B** _ 7191 ⁵ Chromium 99 200.7 6010B Cobalt 99 220.2 200.7 **★6010B** __7211 ⁵ Copper 99 200.7 6010B Iron 99 3113B № 6010B _ 7421 ^в 200.7 239.2 Lead 99 1620 200.7 6010B __7430 ⁴ Lithium 99 200.7 6010B Magnesium 99 200.7 6010B Manganese 99 245.1 ² 245.5 ² 7470A³<u>≁</u>7471A³ Mercury 99 200.7 6010B Molybdenum 99 200.7 **7**6010**B** Nickel 99 258.1 4 7610 4 200.7 6010B Potassium 99 1620 200.71 6010B ¹ Rare Earths 99 _7740 ^s 200.7 270.2 3113B >~ 6010B Selenium 99 1620 200.7 6010B 1 Silicon 99 1620 200.7 6010B Silica 99 272.2 7761 5 200.7 \sim 6010B Silver 99 273.1 4 200.7 7770 4 6010B Sodium 99 200.7 6010B Strontium 99 279.2 200.9 200.7 7841 ⁵ 6010B Thallium 99 200.7 6010B Tin 99 200.7 6010B Titanium 99 1620 200.7 1 6010B 1 Uranium 99 200.7 6010B Vanadium 99 200.7 6010B Zinc 99

200.7 1

6010B 1

Zirconium

Other:

05

1620

METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

- U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- * = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

MB = Method or Preparation Blank.

MS = Matrix Spike.

MSD = Matrix Spike Duplicate.

REP = Sample Replicate

LCS = Laboratory Control Sample.

NC = Not calculated.

ANALYTICAL METAL METHODS

- 1. Not included in the method element list.
- 2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, approximately 0.3 grams of sample is taken to a final volume of 50 mL (including all reagents).
- 3. Flame AA.
- 4. Graphite Furnace AA.

L-WI-033/N-04/98

INORGANICS DATA SUMMARY REPORT 07/10/03

CLIENT: TNUHANFORD F03-006 H2264 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0306L625

REPORTING

DILUTION

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
	******	***************	******		****	
-001	B161C2	Silver, Total	0.11 u	MG/KG	0.11	1.0
		Arsenic, Total	2.3	MG/KG	0.30	1.0
		Boron, Total	1.0	MG/KG	0.17	1.0
		Barium, Total	52.3	MG/KG	0.02	1.0
		Beryllium, Total	0.12	MG/KG	0.009	1.0
		Bismuth, Total	.0.47 u	MG/KG	0.47	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Chromium, Total	11.2	MG/KG	0.09	1.0
		Copper, Total	13.0	MG/KG	0.06	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	11.2	MG/KG	0.12	1.0
		Lead, Total	2.8	MG/KG	0.21	1.0
		Antimony, Total	0.22	MG/KG	0.20	1.0
		Selenium, Total	0.39 u	MG/KG	0.39	1.0

INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/10/03

CLIENT: TNUHANFORD F03-006 H2264

LVL LOT #: 0306L625

WORK ORDER: 3	11343-606-001-9999-00
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					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
*****		京中文文章 医马克尔耳氏 10 mm 10 m				=======
BLANK1	03L0359-MB1	Silver, Total	0.12 u	MG/KG	0.12	1.0
		Arsenic, Total	0.33 u	MG/KG	0.33	1.0
		Boron, Total	0.26	MG/KG	0.19	1.0
		Barium, Total	0.03	MG/KG	0.02	1.0
		Beryllium, Total	0.03	MG/KG	0.01	1.0
		Bismuth, Total	0.51 u	MG/KG	0.51	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Chromium, Total	0.10 u	MG/KG	0.10	1.0
		Copper, Total	0.06 u	MG/KG	0.06	1.0
		Nickel, Total	0.13 u	MG/KG	0.13	1.0
		Lead, Total	0.23 u	MG/KG	0.23	1.0
		Antimony, Total	0.22 u	MG/KG	0.22	1.0
		Selenium, Total	0.42 u	MG/KG	0.42	1.0
BLANK1	03C0150-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

INORGANICS ACCURACY REPORT 07/10/03

CLIENT: TNUHANFORD F03-006 H2264
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0306L625

			SPIKED	INITIAL	SPIKED		DILUTION
SAMPLE	SITE ID	ANALYTE	SAMPLE	RESULT	TRUOMA	*RBCOV	factor (SPK)
*======		医急性性神经性性神经性性神经性性神经性			*****	FFFEE	
-001	B161C2	Silver, Total	4.5	0.11u	4.8	93.8	1.0
		Arsenic, Total	180	2.3	191	93.1	1.0
		Boron, Total	89.4	1.0	95.5	92.6	1.0
•		Barium, Total	236	52.3	191	96.1	1.0
		Beryllium, Total	4.8	0.12	4.8	97.6	1.0
		Bismuth, Total	454	0. 4 7u	478	95.0	1.0
		Cadmium, Total	4.6	0.04u	4.8	95.8	1.0
		Chromium, Total	29.0	11.2	19.1	93.2	1.0
		Copper, Total	34.5	13.0	23.9	90.0	1.0
		Mercury, Total	0.15	0.02u	0.15	101.3	1.0
		Nickel, Total	55.8	11.2	47.7	93.5	1.0
		Lead, Total	48.2	2.8	47.7	95.2	1.0
		Antimony, Total	26.6	0.22	47.7	55.3	1.0
		Selenium, Total	173	0.39u	191	90.6	1.0

INORGANICS PRECISION REPORT 07/10/03

CLIENT: TNUHANFORD F03-006 H2264

LVL LOT #: 0306L625

WORK ORDER: 11343-606-001-99

SAMPLE SITE ID ANALYTE RESULT REPLICATE RPD FACTOR (REP)								
### Parameter				INITIAL				DILUTION
-001REP B161C2 Silver, Total 0.11u 0.12u NC 1.0 Arsenic, Total 2.3 1.9 19.0 1.0 Boron, Total 1.0 0.74 29.8 1.0 Barium, Total 52.3 53.7 2.6 1.0 Beryllium, Total 0.12 0.16 29.6 1.0 Bismuth, Total 0.47u 0.50u NC 1.0 Cadmium, Total 0.04u 0.04u NC 1.0 Chromium, Total 11.2 9.7 14.4 1.0 Copper, Total 13.0 10.9 17.6 1.0 Mercury, Total 0.02u 0.02u NC 1.0 Nickel, Total 11.2 12.1 7.7 1.0 Lead, Total 2.8 2.7 3.6 1.0 Antimony, Total 0.22 0.22u NC NA	SAMPLE	SITE ID	ANALYTE	RESULT	REPLICATE	RPD		FACTOR (REP)
Arsenic, Total 2.3 1.9 19.0 1.0 Boron, Total 1.0 0.74 29.8 1.0 Barium, Total 52.3 53.7 2.6 1.0 Beryllium, Total 0.12 0.16 29.6 1.0 Bismuth, Total 0.47u 0.50u NC 1.0 Cadmium, Total 0.04u 0.04u NC 1.0 Chromium, Total 11.2 9.7 14.4 1.0 Copper, Total 13.0 10.9 17.6 1.0 Mercury, Total 0.02u 0.02u NC 1.0 Nickel, Total 11.2 12.1 7.7 1.0 Lead, Total 2.8 2.7 3.6 1.0 Antimony, Total 0.22 0.22u NC 1.0	55=##FF		# 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		******		•	*********
Boron, Total 1.0 0.74 29.8 1.0 Barium, Total 52.3 53.7 2.6 1.0 Beryllium, Total 0.12 0.16 29.6 1.0 Bismuth, Total 0.47u 0.50u NC 1.0 Cadmium, Total 0.04u 0.04u NC 1.0 Chromium, Total 11.2 9.7 14.4 1.0 Copper, Total 13.0 10.9 17.6 1.0 Mercury, Total 0.02u 0.02u NC 1.0 Nickel, Total 11.2 12.1 7.7 1.0 Lead, Total 2.8 2.7 3.6 Antimony, Total 0.22 0.22u NC NA	-001RBP	B161C2	Silver, Total	0.11u	0.12u	NC		1.0
Barium, Total 52.3 53.7 2.6 1.0 Beryllium, Total 0.12 0.16 29.6 1.0 Bismuth, Total 0.47u 0.50u NC 1.0 Cadmium, Total 0.04u 0.04u NC 1.0 Chromium, Total 11.2 9.7 14.4 1.0 Copper, Total 13.0 10.9 17.6 1.0 Mercury, Total 0.02u 0.02u NC 1.0 Nickel, Total 11.2 12.1 7.7 1.0 Lead, Total 2.8 2.7 3.6 1.0 Antimony, Total 0.22 0.22u NC NA			Arsenic, Total	2.3	1.9	19.0		1.0
Beryllium, Total 0.12 0.16 29.6 1.0 Bismuth, Total 0.47u 0.50u NC 1.0 Cadmium, Total 0.04u 0.04u NC 1.0 Chromium, Total 11.2 9.7 14.4 1.0 Copper, Total 13.0 10.9 17.6 1.0 Mercury, Total 0.02u 0.02u NC 1.0 Nickel, Total 11.2 12.1 7.7 1.0 Lead, Total 2.8 2.7 3.6 1.0 Antimony, Total 0.22 0.22u NC 1.0			Boron, Total	1.0	0.74	29.8		1.0
Bismuth, Total 0.47u 0.50u NC 1.0 Cadmium, Total 0.04u 0.04u NC 1.0 Chromium, Total 11.2 9.7 14.4 1.0 Copper, Total 13.0 10.9 17.6 1.0 Mercury, Total 0.02u 0.02u NC 1.0 Nickel, Total 11.2 12.1 7.7 1.0 Lead, Total 2.8 2.7 3.6 1.0 Antimony, Total 0.22 0.22u NC NA			Barium, Total	52.3	53.7	2.6		1.0
Cadmium, Total 0.04u 0.04u NC 1.0 Chromium, Total 11.2 9.7 14.4 1.0 Copper, Total 13.0 10.9 17.6 1.0 Mercury, Total 0.02u 0.02u NC 1.0 Nickel, Total 11.2 12.1 7.7 1.0 Lead, Total 2.8 2.7 3.6 1.0 Antimony, Total 0.22 0.22u NC 1.0			Beryllium, Total	0.12	0.16	29.6		1.0
Chromium, Total 11.2 9.7 14.4 1.0 Copper, Total 13.0 10.9 17.6 1.0 Mercury, Total 0.02u 0.02u NC 1.0 Nickel, Total 11.2 12.1 7.7 1.0 Lead, Total 2.8 2.7 3.6 1.0 Antimony, Total 0.22 0.22u NC WO			Bismuth, Total	0.47u	0.50u	NC		1.0
Copper, Total 13.0 10.9 17.6 1.0 Mercury, Total 0.02u 0.02u NC 1.0 Nickel, Total 11.2 12.1 7.7 1.0 Lead, Total 2.8 2.7 3.6 1.0 Antimony, Total 0.22 0.22u NC 100 MU			Cadmium, Total	0.041	0.04u	NC		1.0
Mercury, Total 0.02u 0.02u NC 1.0 Nickel, Total 11.2 12.1 7.7 1.0 Lead, Total 2.8 2.7 3.6 1.0 Antimony, Total 0.22 0.22u xc 100			Chromium, Total	11.2	9.7	14.4		1.0
Nickel, Total 11.2 12.1 7.7 1.0 Lead, Total 2.8 2.7 3.6 1.0 Antimony, Total 0.22 0.221 xc 100 1.0			Copper, Total	13.0	10.9	17.6		1.0
Lead, Total 2.8 2.7 3.6 1.0 Antimony, Total 0.22 0.22u xc 100 1.0			Mercury, Total	0.02u	0.02u	NC		1.0
Antimony, Total 0.22 0.22u x 100 1.0		•	Nickel, Total	11.2	12.1	7.7		1.0
Mi			Lead, Total	2.8	2.7			1.0
Selenium, Total 0.39u 0.41u NC 1.0			Antimony, Total	0.22	0.22u	ac		1.0
			Selenium, Total	0.39u	0.41u	NC	Maple	1.0

INORGANICS LABORATORY CONTROL STANDARDS REPORT 07/10/03

CLIENT: TNUHANFORD F03-006 H2264

LVL LOT #: 0306L625

WORK ORDER: 11343-606-001-9999-00

			SPIKED	SPIKED		
SAMPLE	SITE ID	ANALYTE	SAMPLE	AMOUNT	UNITS	*RBCOV
	======================================		=====			
LCS1	03L0359-LC1	Silver, LCS	48.2	50.0	MG/KG	96.4
		Arsenic, LCS	931	1000	MG/KG	93.1
		Boron, LCS	475	500	MG/KG	94.9
•		Barium, LCS	513	500	MG/KG	102.6
		Beryllium, LCS	24.1	25.0	MG/KG	96.4
		Bismuth, LCS	492	500	MG/KG	98.5
		Cadmium, LCS	24.6	25.0	MG/KG	98.4
		Chromium, LCS	49.9	50.0	MG/KG	99.8
		Copper, LCS	126	125	MG/KG	100.9
		Nickel, LCS	204	200	MG/KG	102.2
		Lead, LCS	246	250	MG/KG	98.3
		Antimony, LCS	289	300	MG/KG	96.2
		Selenium, LCS	863	1000	MG/KG	86.3
LCS1	03C0150-LC1	Mercury, LCS	6.4	6.2	MG/KG	102.8

ionville Labor			Custo	dy Tra									qu	es	t Pa	age_	<u> </u> of	i		Ü	Ž	V	L	
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Client TNU	- HA	WFOR	O FOI	-006			Refrige	rator #		 	2						=	-	7	2-	 	}		
Est. Final Pro	j. Samp	oling Date					#/Туре	Container	Liquid		-						100	 	1					
			-606-001	9999-n	0				Solid	ļ	IAG	}		IAG		-	IA6	1	IAG	IAG	├─	 -		_
Project Conta	-						Volum	e	Liquid	-	125		-	10		-	60		100	60	 	╁┷┷┤		
Lionville Labo	Pratory	Project Ma	anager	01			Preser	vatives	2040	├	1173	-		60			60	┼	125	180				
<u>oc</u>		Del	TAT CT	30	gan1		1886		<u> </u>	-	ORG	ANIC		ake of	-		IN.	ORG	50,	1.02		+		
Date Rec'd	6-	13-03	Date Due	7-17	- <i>0</i> 3		ANALY	SES	-	۷٥۸	BNA	Pest	Herb	A STAN			ا Metal	S	bin to	203				
MATRIX						Matrix						,	Ţ		Lionv	ille La	bora	tory U		у	1	-		
CODES: S - Soil SE - Sediment SO - Solid	Lab ID		Client ID/Des	cription		OC hosen (*)		Matrix Date Coffected Collected による		R2 45		OGCSC			METO		INORGO	INSAZ	#OGGK HCR6		(
SL - Sludge W - Water	 	70.7				S MSI		 		 	-	}	 -	+-	 	 -	┼	┼	+	+	+	+-	-	†
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Special Instruc	tions:	- 1 E	# F03 -0	01-		DAT	E/REVISH	ONS:											Llon	rille Lai	borato	ry Use	Only	
MET O:	RC : I	RA + 51	b. Be. Bi. , F, NO3 , . , ZPH , I	B.Cu.N. NO2,PO4.	50 ¢ Relin	quished		1	ORM	Zaik.	TAI	lme		screpan rmples I			-	Sample Sample 1) Ship Hand D Airbill # 2) Amb 3) Recoonditi 4) Sam Propert	ped	or hilled Good or N) ; ;	Tamper Re 1) Prese Package 2) Unbro Package 3) Prese 4) Unbro Sample COC Re Upon Se	ont on Cooken on Soloton Sol	Outer IT N Outer IT N Sample or N IN IN Tesent
FEREN	. 1	J. Th	1 6-13-0	3 0910		CO::	7 0 SП	E	REW	RII	TE	¥	co	C Rec				Holding	Times	or N		Cooler Temp	1.5	_`. ℃

(Y) or N

FH-Central Plateau Project	CH	AIN OF CUST	ODY/S	AMPL	E ANA	LYS	IS I	REQUEST		F03-	006-189	Page 1 o	f 1
Collector P 6-11-3 Johansen/Pope/Pfister/Hughes	Compan	v Contact	Telephor 373-3	ne No.			_ [Project Coordin TRENT, SJ	eter Pr	ice Code	8N	Data Turr	1
Project Designation 200-PW-2/200-PW-4 OU - Borehole Soil Sampling		E Location 3-12 (C3246); 197.5-200	 0				1	SAF No. F03-006	Ai	r Quality		45 D	ays
Ice Chest No.	Field Lo	ogbook No. N-3361		COA 1175041	 ES10			Method of Ships Federal Expres					
Shipped To TM56-4-03 EBERLINE SERVICES (FORMERLY TMA) PREUT a	 	Property No.	P030	. 2 8	. 1	· 		Bill of Lading/	Air Bill No.	SE	E 05	PC	
POSSIBLE SAMPLE HAZARDS/REMARKS RADIOACTIVE TIE TO: B171P5		Preservation	Cool 4C	Cool 40			Cool 4	IC Cool 4C	None	None	None		
	}	Type of Container	aG	aG	a(-	∌G	₽G	aG .	aG	•9'		<u> </u>
Special Handling and/or Storage	ļ	No. of Container(s)	1	1	1		1	1	1	1	3/1		
C0014C	[V ₀ lu me	60mL	125mL	60n	i.	125m	iL 60mL	60mL	60mL	60mL		
SAMPLE ANALYSIS	L		See item (1) i Special Instructions	Special	Spec	⊌ `	e item (Special Instruction	1 353,2; Oil &	See item (5) in Special Instructions	See item (f) in Special Particione.	Tritium - H3		
Sample No. Matrix * San	npic Date	Sample Time					r i e				i i i i i i i i i i i i i i i i i i i		e ta us
B161C2 SOIL 6-	11-3	0925	×	X	>		×	×	/	 	 	 	
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	C1 - (D-1-4	None		1 10	PECIAL I	NETRU	CTIC	ONS	20 1	<u> </u> - -3	<u> </u>	<u> </u>	Matrix *
Relinquished By/Removed From Date/Time Received By/Removed From Date/Time 19/7 Received By/Removed From Date/Time 19/7 Received By/Removed From Date/Time 12/8 Received By/Removed From Date/Time 12/8 Received By/Removed From Date/Time 12/8 Received By/Removed From Received By/Removed By/Removed By/Removed From Received By/Removed By/Remo	Sign/Print ined ByStore Lived ByStore ByStore ByStore Collisioned	MANNUM DE REALISE DE LA PROPERTIE DE LA PROPER	Date/Time	1417	ompounds finet by the later by	Glycols, A - 8270/ ange - W is - 6010/ 6010A (S) (1 - (CV) s - 300.0 Total Cyripotheses	H-D a he radii & Ke A (TC/TPH- A (Suj iupertr (Chio anide opy (Case	ion limit of \$0.0 pCi nalysis. FH acknow I characteristics. tones - 8015 (1-But L); Semi-VOA 82 D; TPH-Gasoline R; pertrace) (Arsenic, I race Add-On) (Antir ride, Fluoride, Nitra	anot, Diestryl 70A (Add-Orange - WTPH Barium, Cadm nony, Beryllin te, Nitrite, Ph 60, Europium 6, Radium 2	ether, Ethylene n) {2-Butoxyeth -G num, Chromium am, Bismuth, B cosphate, Sulfate -132, Busopium 23, The 126, T	glycol, Metha hanol, Tributyl n, Lead, Scleni oron, Copper, e); Ammonia - 	nol} phosphate}; ium, Silver}; Nickel}; 350.3; pH an=155}; Americator	S=Soil SE-Sofiment SO-Soild SY-Stedge W = Water O=Oil A=Air DS-Drum Solids DL_Drum Liquida T=Timme W/n-Wipe L=Liquid V=Vegetation X=Other
FINAL SAMPLE Disposal Method			 _			Disposes	d By					Date/Time	

LIONVILLE LABORATORY INCORPORATED SAMPLE RECEIPT CHECKLIST

ENT: TNU-HAN. LOR A

:hase Order/Project:

DATE: 6-/3-03

#/SOW#/Release#: F-03-006

ioratory SDG #: 0306 625

•	Custody seals on coolers or shipping container intact, signed and dated?	,⊠Yes	□ No	O N/A	☐ see Comment
•	Outside of coolers or shipping containers are free from damage?	D Yes	□ No	□ N/A	see Comment
	Airbill # recorded?	ET Yes	D No	□ N/A	☐ see Comment
•	All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	D Yes	□ No	DNA	D see Comment
	Sample containers are intact?	D'Yes	□ No	DINA	See Comment
•	Custody seals on sample containers intact, signed and dated?	D Yes	□ No	DNA	☐ see Commen
	All samples on coc received?	O Yes	□ No	O N/A	· D see Commen
	All sample label information matches coc?	Yes	□ No	□ N/A·	D see Commen
•	Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	O'Yes	□ N ₀	□ N/A	☐ see Commen
0.	Shipment meets LvLl Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	ETY.es	□ No	D N/A	☐ see Commen
1.	Where applicable, bar code labels are affixed to coc?	□ Yes	D No	BINIA	D see Commer
2.	coc signed and dated?	El Yes	□ No	D N/A	🗆 see Comme
3.	coc will be faxed or emailed to client?	Yes-	D No	D N/A	🖸 see Comme
4.	Project Manager/Client contacted concerning discrepancies? (name/date)	O Yes	, \square No	MINIA	🗆 see Comme

Cooler # / temp (°C) and Comments:

ERC 01-037 1.5

Laboratory Sample Custodian:

Cal Hug

Laboratory Project Manager:



Lionville Laboratory, Inc. INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD F03-006 H2264

DATE RECEIVED: 06/13/03 LVL LOT # :0306L625

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B161C2						
% SOLIDS	001	s	03L%S082	06/11/03	06/19/03	06/20/03
% SOLIDS	001 REP	S	03L%S082	06/11/03	06/19/03	06/20/03
CHLORIDE BY IC	001	S	03LICA39	06/11/03	06/19/03	06/19/03
CHLORIDE BY IC	001 REP	s	03LICA39	06/11/03	06/19/03	06/19/03
CHLORIDE BY IC	001 MS	S	03LICA39	06/11/03	06/19/03	06/19/03
FLUORIDE BY IC	001	S	03LICA39	06/11/03	06/19/03	06/19/03
FLUORIDE BY IC	001 REP	S	03LICA39	06/11/03	06/19/03	06/19/03
FLUORIDE BY IC	001 MS	S	03LICA39	06/11/03	06/19/03	06/19/03
NITRITE BY IC	001	S	03LICA39	06/11/03	06/19/03	06/19/03
NITRITE BY IC	001 REP	S	03LICA39	06/11/03	06/19/03	06/19/03
NITRITE BY IC	001 MS	s	03LICA39	06/11/03	06/19/03	06/19/03
NITRATE BY IC	001	S	03LICA39	06/11/03	06/19/03	06/19/03
NITRATE BY IC	001 REP	S	03LICA39	06/11/03	06/19/03	06/19/03
NITRATE BY IC	001 MS	S	03LICA39	06/11/03	06/19/03	06/19/03
TOTAL CYANIDE	001	s	03LC058	06/11/03	06/20/03	06/20/03
TOTAL CYANIDE	001 REP	S	03LC058	06/11/03	06/20/03	06/20/03
TOTAL CYANIDE	001 MS	S	03LC058	06/11/03	06/20/03	06/20/03
PHOSPHATE BY IC	001	S	03LICA39	06/11/03	06/19/03	06/19/03
PHOSPHATE BY IC	001 REP	S	03LICA39	06/11/03	06/19/03	06/19/03
PHOSPHATE BY IC	001 MS	S	03LICA39	06/11/03	06/19/03	06/19/03
CHROMIUM VI	001	s	03LVI052	06/11/03	06/27/03	06/27/03
CHROMIUM VI	001 REP	S	03LVI052	06/11/03	06/27/03	06/27/03
CHROMIUM VI	001 MS	S	03LVI052	06/11/03	06/27/03	06/27/03
CHROMIUM VI	001 MSD	S	03LVI052	06/11/03	06/27/03	06/27/03
SULFATE BY IC	001	S	03LICA39	06/11/03	06/19/03	06/19/03
SULFATE BY IC	001 REP	S	03LICA39	06/11/03	06/19/03	06/19/03
SULFATE BY IC	001 MS	s	03LICA39	06/11/03	06/19/03	06/19/03
NITRATE NITRITE	001	s	03LN3B31	06/11/03	06/24/03	06/24/03
NITRATE NITRITE	001 REP	S	03LN3B31	06/11/03	06/24/03	06/24/03
NITRATE NITRITE	001 MS	S	03LN3B31	06/11/03	06/24/03	06/24/03
AIROMMA	001	S	03LAMA16	06/11/03	06/30/03	06/30/03
AMMONIA	001 REP	s	03LAMA16	06/11/03	06/30/03	06/30/03
AMMONIA	001 MS	S	03LAMA16	06/11/03	06/30/03	06/30/03
OIL & GREASE BY GRAV	001	S	03LOG028	06/11/03	06/24/03	06/26/03
OIL AND GREASE BY GR	001 REP	S	03LOG028	06/11/03	06/24/03	06/26/03

Lionville Laboratory, Inc. INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD F03-006 H2264

LVL LOT # :0306L625 DATE RECEIVED: 06/13/03 CLIENT ID /ANALYSIS LVL # MTX PREP # COLLECTION EXTR/PREP ANALYSIS OIL AND GREASE BY GR 001 MS S 03LOG028 06/11/03 06/24/03 06/26/03 001 S 03LPH040 06/11/03 06/16/03 06/16/03 PH 001 REP S 03LPH040 06/11/03 06/16/03 06/16/03 PH LAB QC: CHLORIDE BY IC MB1 S 03LICA39 N/A 06/19/03 06/19/03 MB1 BS N/A 06/19/03 06/19/03 CHLORIDE BY IC S 03LICA39 N/A 06/19/03 06/19/03 FLUORIDE BY IC MB1 S 03LICA39 FLUORIDE BY IC MB1 BS S 03LICA39 N/A 06/19/03 06/19/03 06/19/03 NITRITE BY IC MB1 S 03LICA39 N/A 06/19/03 NITRITE BY IC MB1 BS S 03LICA39 N/A 06/19/03 06/19/03 N/A 06/19/03 06/19/03 NITRATE BY IC MB1 S 03LICA39 NITRATE BY IC MB1 BS N/A 06/19/03 06/19/03 S 03LICA39 06/20/03 06/20/03 TOTAL CYANIDE LCS L S 03LC058 N/A TOTAL CYANIDE LCS L N/A 06/20/03 06/20/03 S 03LC058 TOTAL CYANIDE MB1 S 03LC058 N/A 06/20/03 06/20/03 PHOSPHATE BY IC MB1 S 03LICA39 N/A 06/19/03 06/19/03 PHOSPHATE BY IC MB1 BS S 03LICA39 N/A 06/19/03 06/19/03 CHROMIUM VI MB1 S 03LVI052 N/A 06/27/03 06/27/03 MB1 BS 06/27/03 06/27/03 CHROMIUM VI S 03LVI052 N/A CHROMIUM VI MB1 BSD S 03LVI052 N/A 06/27/03 06/27/03 SULFATE BY IC MB1 S 03LICA39 N/A 06/19/03 06/19/03 SULFATE BY IC MB1 BS S 03LICA39 N/A 06/19/03 06/19/03 NITRATE NITRITE MB1 S 03LN3B31 N/A 06/24/03 06/24/03 06/24/03 NITRATE NITRITE MB1 BS S 03LN3B31 N/A 06/24/03 06/30/03 AMMONIA MB1 S 03LAMA16 N/A 06/30/03 MB1 BS 06/30/03 AMMONIA S 03LAMA16 N/A 06/30/03 AMMONIA MB1 BSD S 03LAMA16 N/A 06/30/03 06/30/03 OIL & GREASE BY GRAV MB1 S 03LOG028 N/A 06/24/03 06/26/03

S 03LOG028

S 03LOG028

N/A

N/A

06/24/03

06/24/03

06/26/03

06/26/03

OIL AND GREASE BY GR MB1 BS

OIL AND GREASE BY GR MB1 BSD



Analytical Report

Client: TNU-HANFORD F03-006 H2264

LVL#: 0306L625

W.O.#: 11343-606-001-9999-00

07-11-03

Date

Date Received: 06-13-03

INORGANIC NARRATIVE

1. This narrative covers the analyses of 1 soil sample.

- 2. The sample was prepared and analyzed in accordance with the methods indicated on the attached glossary.
- 3. The sample holding times as required by the method and/or contract were met.
- 4. The results presented in this report are derived from samples that met LvLI's sample acceptance policy.
- 5. The method blanks were within the method criteria.
- 6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS for Ammonia and Oil and Grease were within the 20% Relative Percent Difference (RPD) control limit.
- 7. The matrix spike recoveries for Chloride, Fluoride, Nitrite, Nitrate, Total Cyanide, Phosphate, Chromium VI, Sulfate, Nitrate Nitrite, Ammonia and Oil and Grease were within the 75-125% control limits.
- 8. The replicate analyses for Percent Solids, Chloride, Fluoride, Nitrite, Nitrate, Total Cyanide, Phosphate, Chromium VI, Sulfate, Nitrate Nitrite, Ammonia, Oil and Grease and pH were within the 20% RPD control limit.
- 9. Results for solid samples are reported on a dry weight basis.
- 10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

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njp\i06-625

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 14 pages.

Lionville Laboratory Incorporated

WET CHEMISTRY

METHODS GLOSSARY FOR SOIL/SOLIDS SAMPLE ANALYSIS

	<u>ASTM</u>	<u>SW846</u>	<u>OTHER</u>
% Ash	D2216-80		
% Moisture	,D2216-80		ILMO4.0 (e)
% Solids	_/ D2216-80		
% Volatile Solids	D2216-80		_ ``
ASTM Extraction in Water	D3987-81/85		
BTU	D240-87		
CEC	_	9081	c
Chromium VI		√ 3060A/7196A	_
Corrosivity by coupon by pH			
Cyanide, Total		V 9010B/9014	ILMO4.0 (e)
Cyanide, Reactive		Section 7.3/9014	
Halides, Extractable Organic		9020B	EPA 600/4/84-008
Halides, Total		9020B	EPA 600/4/84-008
EP Toxicity		1310A	
Flash Point		1010	
Ignitability		1010	,
Oil & Grease		√ 9071A	1413.1 (mad.)
Carbon, Total Organic		9060	Lloyd Kahn (mod)
Oxygen Bomb Prep for Anions	D240-87(mod)	5050	_
Petroleum Hydrocarbons, Total Recove	erable	9071	EPA 418.1
pH, Soil		√ 9045C	
Sulfide, Reactive		Section 7.3/9030B	
Sulfide		9030B(mod)	
Specific Gravity	D1429-76C/	D5057-90	
Sulfur, Total	_	9056	
Synthetic Preparation Leach		1312	
Paint Filter		9095A	
Other: Chearide Tenaride Nitrit	0 Method: ϵ	PA 300.0 (mod.)	
Other: Attrate Phosphato Aullat	Method		
Athate Mitrite	E	PA 353.2 (mod.) PA 350.3	
ammonia	El	A 350.3	•

Lionville Laboratory Incorporated

METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

- U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- * = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

MB = Method or Preparation Blank.

MS = Matrix Spike.

MSD = Matrix Spike Duplicate.

REP = Sample Replicate

LC = Laboratory Control Sample.

NC = Not calculated.

A suffix of -R, -S, or -T following these codes indicate a replicate, spike or sample duplicate analysis respectively.

ANALYTICAL WET CHEMISTRY METHODS

- 1. ASTM Standard Methods.
- USEPA Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020).
- Test Methods for Evaluating Solid Waste (USEPA SW-846).
- a. Standard Methods for the Examination of Water and Waste, 16 ed, (1983).
- b. Standard Methods for the Examination of Water and Waste, 17 ed, (1989)/18ed (1992).
- c. Method of Soil Analysis, Part 1, Physical and Mineralogical Methods, 2nd ed, (1986).
- d. Method of Soil Analysis, Part 2, Chemical and Microbiological Properties, Am. Soc. Agron., Madison, WI (1965).
- e. USEPA Contract Laboratory Program, Statement of Work for Inorganic Analysis.
- f. Code of Federal Regulations.

INORGANICS DATA SUMMARY REPORT 07/03/03

8.7

CLIENT: TNUHANFORD F03-006 H2264 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0306L625

SOIL PH

0.01

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
			*****		********	=======
-001	B161C2	♦ Solids	97.9	*	0.01	1.0
		Chloride by IC	1.3 u	MG/KG	1.3	1.0
		Fluoride by IC	1.3 u	MG/KG	1.3	1.0
		Nitrite by IC	1.28 u	MG/KG	1.28	1.0
		Nitrate by IC	62.0	MG/KG	6.38	5.0
		Cyanide, Total	0.34 u	MG/KG	0.34	1.0
		Phosphate by IC	1.3 u	MG/KG	1.3	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
		Sulfate by IC	6.8	MG/KG	1.3	1.0
		Nitrate Nitrite	15.4	MG/KG	0.85	5.0
		Ammonia, as N	4.8 u	MG/KG	4.8	1.0
		Oil & Grease Gravimetri	681 u	MG/KG	681	1.0

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INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/03/03

CLIENT: TNUHANFORD F03-006 H2264 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0306L625

ALM DY D	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
SAMPLE	SITE ID	MANIE				
	************		*******			*****
BLANK10	03LICA39-MB1	Chloride by IC	1.2 u	MG/KG	1.2	1.0
		Fluoride by IC	1.2 u	MG/KG	1.2	1.0
		Nitrite by IC	1.25 u	MG/KG	1.25	1.0
		Nitrate by IC	1.25 u	MG/KG	1.25	1.0
		Phosphate by IC	1.2 u	MG/KG	1.2	1.0
		Sulfate by IC	1.2 u	MG/KG	1.2	1.0
BLANK1	03LC058-MB1	Cyanide, Total	0.50 u	MG/KG	0.50	1.0
BLANK10	03LVI052-MB1	Chromium VI	0.40 u	MG/KG	0.40	1.0
BLANK10	03LN3B31-MB1	Nitrate Nitrite	0.20 u	MG/KG	0.20	1.0
BLANK10	03LAMA16-MB1	Ammonia, as N	5.0 u	MG/KG	5.0	1.0
BLANK10	03LOG028-MB1	Oil & Grease Gravimetri	667 u	MG/KG	667	1.0

INORGANICS ACCURACY REPORT 07/03/03

CLIENT: TNUHANFORD F03-006 H2264 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0306L625

			SPIKED	INITIAL	SPIKED		DILUTION
SAMPLE	SITE ID	ANALYTE	SAMPLE	RESULT	AMOUNT	*RECOV	FACTOR (SPK)

-001	B161C2	Chloride by IC	25.8	0.59	25.5	98.6	1.0
		Fluoride by IC	25.4	0.32	25.5	98.1	1.0
		Nitrite by IC	24.9	1.284	25.5	97.3	1.0
		Nitrate by IC	195	62.0	128	103.8	5.0
		Cyanide, Total	2.81	0.34u	2.93	95.8	1.0
•		Phosphate by IC	24.1	1.3 u	25.5	94.2	1.0
		Soluble Chromium VI	3.7	0.41u	4.1	88.0	1.0
		Insoluble Chromium VI	1110	0.41u	1140	97.7	100
		Sulfate by IC	33.2	6.B	25.5	103.3	1.0
		Nitrate Nitrite	18.7	15.4	4.4	76.4	5.0
		Ammonia, as N	170	4.B u	178	95.3	1.0
		Oil & Grease Gravimetr	7750	681 u	7750	100	1.0
BLANK10	03LICA39-MB1	Chloride by IC	23.9	1.2 u	25.0	95.8	. 1.0
	•	Fluoride by IC	24.2	1.2 u	25.0	97.0	1.0
		Nitrite by IC	23.5	1.25u	25.0	93.9	1.0
		Nitrate by IC	24.1	1.25u	25.0	96.4	1.0
		Phosphate by IC	24.4	1,2 u	25.0	97.4	1.0
		Sulfate by IC	24.4	1.2 u	25.0	97.8	1.0
BLANK10	03LVI052-MB1	Soluble Chromium VI	4.0	0.40u	4.0	99.3	1.0
		Insoluble Chromium VI	1240	0.40u	1240	99.5	100
BLANK10	03LN3B31-MB1	Nitrate Nitrite	5.0	0.20u	5.0	100.4	1.0
BLANK10	03LAMA16-MB1	Ammonia, as N	180	5.0 u	200	90.0	1.0
		Ammonia, as N MSD	186	5.0 u	200	93.0	1.0
BLANK10	03LOG028-MB1	Oil & Grease Gravimetr	7450	667 u	7590	98.2	1.0
		Oil & Grease - Grav M	7520	667 u	7590	99.1	1.0

INORGANICS DUPLICATE SPIKE REPORT 07/03/03

CLIENT: TNUHANFORD F03-006 H2264 LVL LOT #: 0306L625

WORK ORDER: 11343-606-001-9999-00

			SPIKB#1	SPIKE#:	2
SAMPLE	SITE ID	ANALYTE	*RECOV	*RBCOV	*DIFF
					======
BLANK10	03LAMA16-MB1	Ammonia, as N	90.0	93.0	3.3
BLANK10	03LOG028-MB1	Oil & Grease - Grav	98.2	99.1	0.89

INORGANICS PRECISION REPORT 07/03/03

CLIENT: TNUHANFORD F03-006 H2264 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0306L625

NC

0.0

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1.0

1.0

			INITIAL			DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	REPLICATE	RPD	FACTOR (REP)

-001RBP	B161C2	* Solids	97.9	97.7	0.16	1.0
		Chloride by IC	1.3 u	1.3 u	NC	1.0
		Fluoride by IC	1.3 u	1.3 u	NC	1.0
		Nitrite by IC	1.28u	1.28u	NC	1.0
		Nitrate by IC	62.0	64.1	3.4	5.0
		Cyanide, Total	0.34u	0.20u	NC	1.0
		Phosphate by IC	1.3 u	1.3 u	NC	1.0
		Chromium VI	0.41u	0.41u	NC	1.0
		Sulfate by IC	6.8	7.2	5.2	1.0
		Nitrate Nitrite	15.4	15.5	0.87	5.0
		Ammonia, as N	4.8 u	5.0 u	NC	1.0

Oil & Grease Gravimetri 681 u 681 u

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INORGANICS LABORATORY CONTROL STANDARDS REPORT 07/03/03

CLIENT: TNUHANFORD F03-006 H2264

LVL LOT #: 0306L625

WORK ORDER: 11343-606-001-9999-00

			SPIKED	SPIKED	•	
SAMPLE	SITE ID	ANALYTE	SAMPLE	TRUOMA	UNITS	*RBCOV
LCSS1	03LC058-LCS1	Cyanide, Total LCS	1.91	2.0	MG/KG	95.4
LCSS2	03LC058-LC82	Cyanide, Total LCS	9.92	10.0	MG/KG	99.2

Lionville	Laboratory	Use	Only

Custody Transfer Record/Lab Work Request Page 1 of 1

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0306L	625			FIELD PERS	ONNI	EL: C	OMPLE	ETE ONL	Y SHAD	ED /	AREA A	S		В			c _		0>	E	De	OWNITE IV	RORATOR	Y INC.
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Est. Final Pro	-						##	0-4-1	Liquid												ļ			
Project #	,, oo,,,,	11343-	606-001-	9999-00			#/Type	Container	Solid		AG			IAG			IA6	3.5	1AG	116				
Project Conta							Volume		Liquid						3						 			
Lionville Labo	oratory	Project Ma	nager	07					Solid		125			60		بنب	60		125	60		\vdash		-
ac Spec		Del51	TAT G	30 Jay	<u> </u>		Preserv	atives	<u> </u>		000	ANIC		- 36			INC) RG	\	~~	 -			
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Date nec d		1	Date Due _		<u> </u>			Γ				10.0	<u> </u>					ory Us			<u> </u>			
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Solids										{				<u> </u>		1						<u> </u>	ļ	
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FH-Central Plateau Project CHAIN OF CUST					TODY/SAMPLE ANALYSIS REQUEST F03-006-189 Page 1 of 1							of 1	
Collector of 6-11-5 Johansen/Pope/Pfister/Hughes			ny Contact Iulstrom	Telephone No. 373-3928				Project Coordin TRENT, SJ	ator	Price Code 8N		Data Turnaround	
1 = -			ng Location B-12 (C3246); 197.5-20	0				SAF No. F03-006	A	Lir Quality		45 1	Days
Ice Chest No.	01.037	,	ogbook No. -N-3361		COA 117504ES	310		Method of Ship Federal Expre					
Shipped To TMTU-9-03	meny TMA) Precra	Offsite	Property No.	A030	286			Bill of Lading	Air Bill N	°. SE	E OF	PC	
POSSIBLE SAMPLE HAZA RADIOACTIVE TIE TO: B171	RDS/REMARKS		Preservation	Cool 4C	Cool 4C	None	Cool	4C Cool 4C	None	None	None /		
Special Handling and/or S	tomas	İ	Type of Container	≱G	aG	aG	aC	a G	aG ·	aG	•9		
	0014C		No. of Container(s)	1	1	1	1		1	1	3/1		
			Volume	60mL	125mL	60mL	1251		60mL	60mL	60mL		
	SAMPLE ANALYSIS			See item (1) in Special Instructions.	Sec item (2) in Special Instructions	See item (3) in Special Instructions.	See item Spec Instruc	iai 353.2: Oil &	See item (5) Special Instructions	Special	Tritium - H3		
Sample No.	Matrix * Sam	ple Date	Sample Time										
B161C2	SOIL 6-	11-3	0925	×	X	X	<u> </u>	<u> </u>	<u> </u>	 	 -	 	
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Relinquished By/Removed From Date/Time 4/7 Date/Time 4/7													
FINAL SAMPLE Disposal M DISPOSITION	lethod					Dispo	sed By				•	Date/Time	

LIONVILLE LABORATORY INCORPORATED SAMPLE RECEIPT CHECKLIST

JENT: TNU-HAN LORA

rchase Order/Project:

DATE: 6-13-03.

F# / SOW# / Release #: F03-006

borstory SDG #: 0306 L625

	ALL ENTRIES MARKED "NO" MUST BE E	₽Yes	□ No		
i.	Custody seals on coolers or shipping container intact, signed and dated?	.⊿ res	LI 146	DNA	☐ see Comment #
2.	Outside of coolers or shipping containers are free from damage?	चिर्पेट	D No	D N/A	D see Comment #
3.	Airbill # recorded?	ET Yes	□ No	D N/A	□ see Comment #
4.	All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	D/Yes	□ No	□ N/A	□ see Comment #
5.	Sample containers are intact?	D Yes	D No	□ N/A	□ see Comment #
6.	Custody seals on sample containers intact, signed and dated?	□ Yes	□ No	□ N/A	See Comment #
7.	All samples on coc received?	☑ Yes	□ No	□ N/A	· D see Comment #
8.	All sample label information matches coc?	₩ Yes	D No	D N/A	D see Comment
9.	Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	D/Yes	D No	DNA	□ see Comment
30.	Shipment meets LvLl Sample Acceptance Policy? (identify all bonles not within policy. See reverse side for policy)	E Yes	□ No	□ N/A	☐ see Comment .
11.	Where applicable, bar code labels are affixed to coc?	□ Yes	D No	BNA	□ see Comment
12.	. coc signed and dated?	E Yes	□ N ₀	DWA	☐ see Comment
13.	. coc will be faxed or emailed to client?	Œ Yes≏	□ No	DNA	D see Comment
14.	. Project Manager/Client contacted concerning discrepancies? (name/date)	r □ Yes	, D No	BNA	🛘 sec Commen

Cooler #	/ te	wb (,	'C) and	Comments:
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ERG 01-037 1.5

Laboratory	S	87	nţ	ole	Cus	todian:
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Laboratory Project Manager:

Cal Way